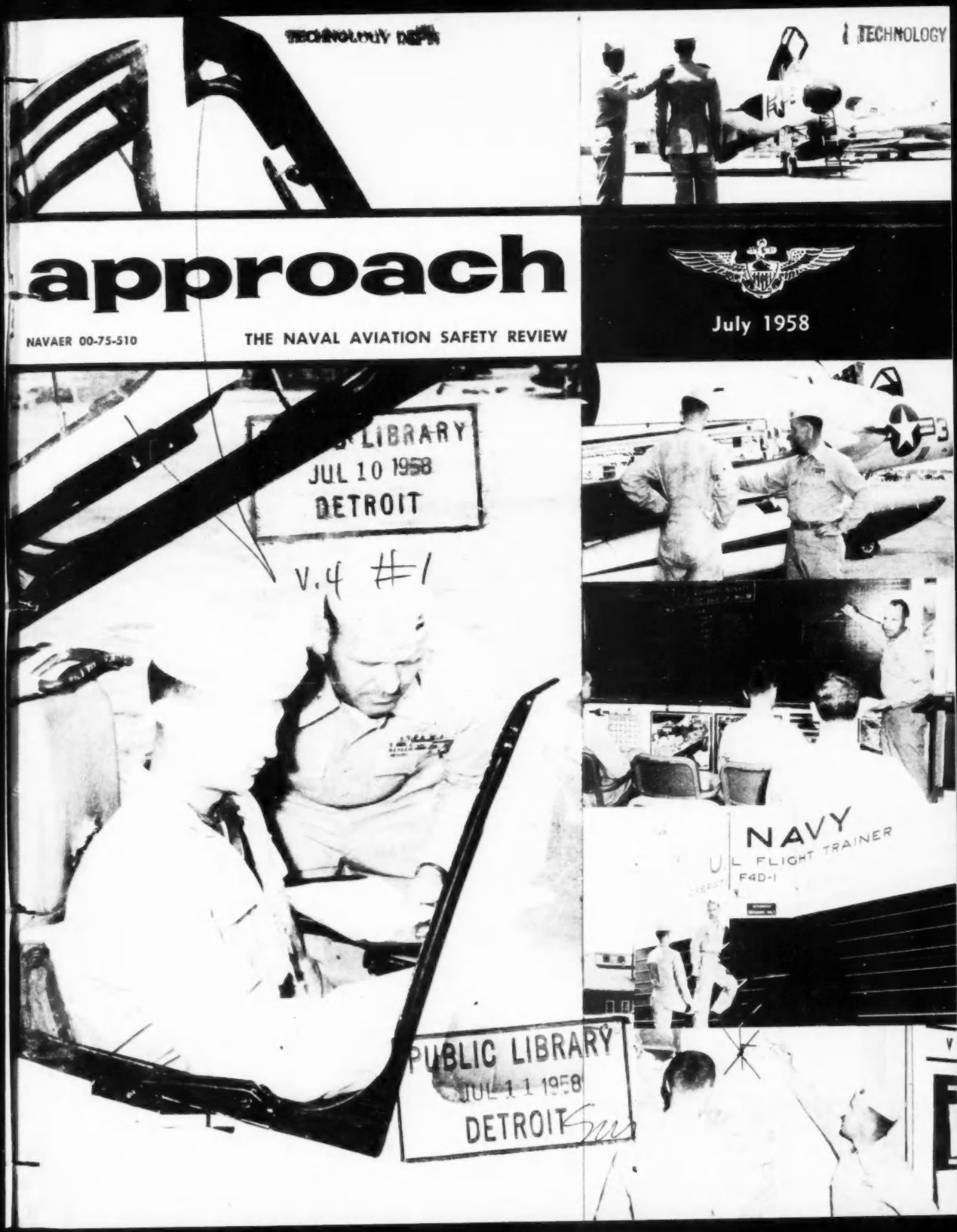
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IN THIS ISSUE

LETTERS

Night Relight

Sir:

Ref Feb Letters "Night & Day Light-offs." A night light-off is exactly the same, but to the pilot it will *probably* not *appear* to be the same.

In the accident in question . . . there is a strong possibility that normal light-offs were obtained. To the pilot, however, the bright glow reflecting from the tail section made him think he was on fire on each of his three relights. Examination of the intact engine and tail section (the airplane landed itself) revealed no trace of fire damage or unusual heat. The DIR on the engine revealed no abnormalities. The negative proof in this unusual case is strong.

. . . another incident strengthened my belief that a night light-off may be normal but spectacular. Following a "May Day" flameout transmission during daytime I heard the wingman's alarmed transmission "He's got a 20' long flame out the back." This, it turned out, was a successful relight on an FJ-4 that did not exceed temperature limitations.

A senior pilot subsequently told of a night flameout in 1951 in an F9F-2 that was equally spectacular but subsided rapidly—before he could do anything about it.

It is my intention to put out an Advisory on the subject if more information can be obtained on the subject. I am firmly against the principle that the pilot is guilty (of Pilot Error) until he proves himself innocent. The negative proof was correctly considered insufficient in the case in question. An account of the problem and its possible spectacular effect at night might help some pilot in the same situation in the future to know what to expect. Being aware of the effect would enable him to more calmly evaluate his night relight, possibly saving one expensive aircraft and maybe one life too.

This may be a case of where a little information can go a long way.

On your comments on "little margin for error" and "ejecting a little higher" (at night) I'm with you all the way.

H. B. HOOPER
LtCol. USMC
ASO 3dMAW

Pitch for Landings

Sir:

While observing many naval aviators engaged in proficiency flying, I have noted what I consider to be a deficiency in the system; namely that there is no requirement for making landings.

I have known several aviators of the rank of LCDR and CDR who who have not landed an aircraft for 3 or 4 years. They always ride co-pilot in the JRB and they always make sure that the other pilot can fly. Right now I could put my finger on three pilots who have gone over a year without making a landing.

Another weakness in the system is that of allowing the copilot to log instrument time whenever the

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pilot is on actual instruments. I have known many pilots who have logged all or most of their instrument time sitting in the copilot's seat of a multi-engined aircraft and just riding like a passenger.

The worst thing about both of these practices is that they are PERFECTLY LEGAL!

OpNav Inst. 3710.15A has promulgated requirements for pilots to maintain their proficiency. When the above two problems are mentioned anywhere they are met with the answer that it is each pilot's responsibility to keep himself qualified, or it is the responsibility of the command having custody of the aircraft. This is true, but if this covers all the field of responsibility, why does the Instruction exist?

I am writing your organization because such a letter can be written informally and because you are interested in such things. I would like to recommend that some action be taken to change OpNav Inst. 3710.15A. It is my opinion that the requirements should read somewhat as follows:

Monthly Requirements for Drawing Flight Pay

a. Four hours' pilot time or copilot time
b. One instrument approach, actual or hooded, or
c. One GCA, actual or hooded
d. One landing

A SKIPPER

Swears by Speed Control

Sir:

Re: Safe Flight Speed Control System (March, pg. 5):

I had one of the earliest models of the Speed Control System installed on my single-engine Bonanza in January 1954. Since that time the system has operated continuously whenever my master switch has been ON. At the moment, it has something over 1,000 hours of actual operation on it, and it's as reliable today as it was the day I first turned it on. It hasn't been touched since the original installation, either by screwdriver or oil case. If just half the other hardware in my airplane was as reliable and trouble-free as this gadget, flying would be pretty inexpensive.

But what's of even greater significance — particularly from the Navy's point of view—is what this device does for the pilot. As you may know, the Bonanza is neither a Cub, sailplane nor a Navy blimp. But you should see this airplane perform with the Speed Control System in it! To oversimplify it, every airplane—including those in the Navy—has a good deal more safe, usable takeoff and landing performance designed into it than the average pilot dares use. This is only right, because the average airplane, without a device such as Speed Control, cannot safely be flown close to its minimum speeds safely by any pilot relying solely upon his experience and instincts. I know that hot pilots are quick to argue this point, but the proof is easy and readily available, but I warn you to be prepared for at least some busted gears when the hot shots try to prove their point.

I'd flown the very first Bonanza ever built, some time before its certification by CAA. But I never knew how to fly a Bonanza truly safely until I began using the Speed Control System. For example, prior to Speed Control I flew the Bonanza — and all airplanes, for that matter — a lot faster on approach and landing than should ever be necessary. You know: five miles for me, five for my wife, and five for each child. And on takeoff, the same sort of blind groping by the pilot: hold the nose down, get it going like hell, yank it off the ground, and trust to luck that everything's going right. Which is all right, if you have a lot of room to play with. Those of us in small civil aircraft have—but in the Navy, for example, there's never enough room — and it's going to get worse with you folks, not better. I can fiddle around on even a 3,000-foot runway, but darned few Navy types I know of have that much margin for error.

With Speed Control even the hottest airplane I've ever flown becomes lukewarm because the pilot can, upon demand, extract from that airplane the maximum safe performance under any weight condition, for any altitude airport, and in any configuration. He can do this instantly; there's no lag in the system, and he need only keep the needle centered.

With my own airplane, for example, I can operate into the smallest legal airport in existence — something I would never have dared before. When the tower asks me to use a certain portion of the runway on a big airport I simply fly the airplane so the needle stays where I want it, then just ride her down onto the spot. I've had just enough time in jets to suspect that such control over the landing and takeoff performance of a jet should be a God-send, not only to Navy pilots' would-be widows, but to the budget-wise people as well.

MAX KARANT
Vice President
AOPA

Depicted on this month's cover are some of the highlights of the first tour pilot's busy first days in his new squadron, the days full of ground training and study, of preparation for his first flight in a real going airplane. VMF(AW)114 offered a real first-tour pilot as our model; APPROACH extends its sincere thanks to the "Death Dealers" for their wholehearted cooperation.

Murphyism

Sir:

Suggest provide maintenance personnel with rolls of colored tape (it comes in many different colors—including plaid). Then when they have to remove a part such as a hydraulic actuating cylinder — where there is danger of reversing the lines upon reinstallation—the lines can be tagged with tape. Use different colors for the UP line

Continued from preceding page

than for the DOWN line. Just put a little piece of tape around the line, one on each side of the fitting or coupling. Do this before disconnecting. Then upon reinstalling, just match up the colors and you can't go wrong. (Unless Murphy's Law runs its inexorable course and applies to the installation of the colored tape). Simple. Eh what?

SHELDON L. CORNER
FLTTraGru GTMO

Yes, indeed, but we wonder how such tapes would fit into the scheme of things? Right now a brown band identifies a line as fire extinguishing—can you imagine the confusion, if, after three disconnects, it also had a red, white and a blue band?—Ed.

Correction

Sir:

Re: WHIZ QUIZ, May issue, pages 29 and 37. Since when does a Mark IV raft have a flashlight? Isn't that just on the life vest? . . .

RIG DIG

Oh boss, not the Dunker again! —Ed.

Picks Nit

Sir:

I've always hated a nit-picker, but now I'm going to become one. In "What's Happened to the Horn," March APPROACH, the author made one very bad error. In his example of no warning horn jets, he should have picked another aircraft other than the TV-2. The TV-2 does have a warning horn. How's he going to explain the high percentage of wheels up in the TV? (*NASC Records show 8 WULs for the TV —Ed.*)

Another article, "Down, Down, Down," on page 15 of the same issue, the pilot doesn't give out much information but obviously he placed himself into a touchy position known to us "Rotor Heads" as Power Settling. The definition I'll quote directly from the HUP Pilots Handbook:

"Power settling (or vortex ring state) may occur at rates of descent ranging from approximately 400-1200 feet per minute in conditions of low airspeed. Flight experience has shown that it seldom occurs in helicopters with tandem-rotor configuration. Indication of power settling is inability to appreciably change rate of descent by application of power. It can easily be eliminated by transition into forward, sideward, or rearward flight."

I pass this along for the benefit of those who have experienced this and didn't recognize it and for those who have not, to either avoid this condition or know the proper procedure to recover from same.

R. C. HAMILTON, LT

See next letter re horn—Ed.

TV Tooter

Sir:

Regarding Anymouse letter "What's Happened to the Horn?" (page 20 March 1958 APPROACH). Commanding Officer, Fleet All Weather Training Unit, Atlantic invites all mice to Key West to listen to our TV horns . . .

G. B. BROWN
Capt., USN

Our mistake for not correcting the original Anymouse letter. Digging deeper into the handbook brought out a possible reason for the bust. The gear horn is set to blow at 65 percent RPM plus or minus 5 percent, thus the lower legal limit can be down to 60 percent RPM. With the book recommending nothing less than 65 percent for penetration and nothing under 65 percent for GCA, ADF/VOR or range approaches, it is possible never to actuate the horn (even with gear up and RPM at 65 percent)—Ed.

Malfunction of Flight Control?

Sir:

Re: "WHY?", May 1958 APPROACH

Since such a remote possibility as self-annihilation was considered as a cause for the described accident, WHY wasn't the more likely possibility of a flight control malfunction also considered? Both personal experience (in an F9F-6) and the first-hand account of an associate (in an F9F-8) indicate that cases of either the flaperons failing to actuate or, once actuated, going to the semi or fully deflected position and remaining there have been encountered.

It is not uncommon to commence a mild rolling pull-up to the left following a low pass in order to circle back to the break position for landing. If this was attempted by the pilot in question and the right flaperon failed to extend, the only remedial action, short of attempting a roll through, would be with the use of the lateral trim tab and/or right rudder *providing* the initial rate of roll was fairly slow.

In the case of the left flaperon sticking in the fully deflected position, it is doubtful if any remedial action other than instant full deflection of the right flaperon to prevent acceleration of the roll followed by trim tab and/or rudder would be feasible. If either of the above described conditions is encountered, the deciding factor is the instantaneous or almost reflexive action required to initiate the recovery prior to the aircraft rolling beyond the wings vertical position since the COUGAR has such a high rate of roll. A pilot, regardless of how good, is bound to get a little "rusty" following several months or more of non-jet flying and this factor combined with the stress of an emergency could quite possibly cause a fatal lag in reaction time.

If the question arises as to why an inspection of the recovered parts would not indicate such a malfunction; a small leak or sticking of a hydraulic valve would be almost impossible to detect, especially after the severe jarring resulting from the impact of a crash.

K. G. BOYER,
LT NAAS CORRY FIELD

You'd be amazed at how much a good crash investigator can learn from pieces. "Something from Nothing" (June '56 APPROACH) is just one of many detective jobs. Whether or not there was a malfunction is extraneous as far as the reason WHY we printed the mess. A low pass is exhilarating, gungho, boosts the troop's morale and all that,—but, must we go all the way?—Ed.

Wheels-up Prevention

Sir:

Regarding the search for a more positive means of preventing wheels-up landings, it seems to me that the problem is basically psychological, that is, pilots think the wheels are down when they are not.

A possible cause of this "wrong-thinking" could be that in both the wheels-up and wheels-down condition all three indications show the same reading, either UP, YOKE, or DOWN. In the UP condition, with all three reading UP, it is possible to make yourself believe

they are really reading DOWN. However, what pilot could look at an indicator showing, DOWN, YOKE, and DOWN and not realize instantly that something was wrong?

Consequently, why not have an indicator which shows three *different* indications when in the UP condition and shows three *identical* readings in the DOWN condition?

Retaining the present YOKE for unsafe would allow the pilot to determine that his gear are UP and LOCKED. Choice of the three indications for UP could be left to the head-shrinkers; or, maybe different colors could be used to advantage. DOWN could be as it is now.

H. H. LOVE,
LT, ATU-202
NAAS Kingsville, Texas

Approach Control Practice Stations

Sir:

Mid-air collisions emphasize the need for an off-airways practice instrument approach area for military aircraft.

I am certain that a large percentage of APPROACH readers have been involved in near misses over range stations while practicing "under-the-hood" approaches. Often the instructor-safety pilot will be watching the instruments with the student pilot instead of keeping a steady scan for other aircraft.

The chase-plane instrument training procedure is also a hair-raising situation. It is a difficult task for a chase-pilot to fly a proper wing position and also keep a sharp lookout for other aircraft.

I know of two close near-misses where due to poor radio reception the chase-pilot was unable to warn the "hooded" pilot of a head-on situation.

My solution to this problem unfortunately involves spending money. Nevertheless, I propose that the Navy and Air Force construct combination radio range, OMNI, and TACAN stations off of airways and away from airports for practice approaches.

All approaches should be controlled from an "approach control" that operates under simulated instrument conditions. Since no landings would be involved, instrument approaches could be handled in very short intervals. To further decrease the time between approaches, a schedule could be made allowing only jet OMNI penetration 0800-0900, Jet ADF penetrations 0900-1100, Standard range approaches (prop) 1200-1300, etc.

The practice station has other advantages besides relieving airways congestion; it would allow pilots to simulate more closely an actual instrument approach since they will be controlled by ground controllers; and it would provide an opportunity to train CAA and military controllers.

If desired, this practice station could be designed to duplicate the type of approaches used at nearby military airfields. The same holding patterns, approach headings and possibly altitudes could be used.

To completely control air traffic, a restricted area should be created around the practice station from the ground up to 25,000 feet. No aircraft could enter this area without permission from the practice station "approach control." Since the practice station would be strictly for training purposes, it should not be used in actual instrument conditions.

One practice station could serve the instrument training purposes of several average sized military fields thus minimizing one of the airway problems and perhaps saving many lives and missions of dollars.

D. T. JOHNSTONE, JR.
LTJG VA-772(J)
NAS Los Alamitos

This has already been forwarded to appropriate authorities for consideration. Other comments, criticisms, and midair recommendations are requested.—Ed.

Sir:

On the subject of proper safetywire used in the proper places: Although the new aluminum safety wire is legal for emergency escape hatches, fire bottles, ... I have instructed our personnel not to accept it in these places due to its similarity in appearance to the steel type and the increasing likelihood of a "Murphy" situation. I consider the light copper wire the only acceptable type for use in spots that require breaking in emergencies.

Please see Headmouse page 23 and "Safetywire SNAFU," page 36.

SAFETY OFFICER

How'do You say it?

Sir:

Subj: "Outboard Wing Droop Leading Edge Screwjack Cast Tongue End Fitting; replacement, extraneous titles therefore, report of:

Great leaping frog legs—how much of this technical gobbledegook do we have to put up with? My men had a helluva time until someone decided this gismo was the thingamajig that broke every time he tested it by whacking it a good one with his torque wrench.

DISCOMBOOBERATED M. O.

'APPROACH' Error

Sir:

Re: APPROACH, Vol. 3, May 1958, No. 11, p 49, Column 1, Line 19 (Paragraph 2a), should read. (?)

"a. When the control stick was moved toward the *left* side of the cockpit, both ailerons moved to the UP position."

J. M. CHITTICK

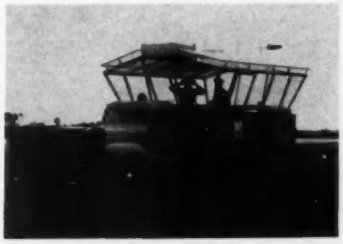
Right—APPROACH *is a victim of the proofreader's version of Murphy's Law.*

Real 'Thang'

Sir:

. . . . . the photograph you published beneath our letter about the "Thang" (May APPROACH) misled some of your readers, they believe it to be "the real Thang". . .

A. J. DA RODDA,
LT, ATU-206



The "real Thang", shown here was constructed from standard stock and salvaged items, contains everything including a kitchen sink. And congratulations too, on your recent achievement of 5000 accident-free-hours. Shoot for ten!—Ed.

Many provocative and meaningful elements lie hidden in the numbered paragraphs of official documents. Of particular personal interest to aviators is a recent instruction change which belatedly buries the pointed term PILOT ERROR. Just what follows and why boils down to —

a matter of factors

THE ULTIMATE objective of naval aviation accident reporting is to provide facts for analysis which, in turn, lead to action and recommendations for preventing accidents.

Quite reasonably then, better reporting of facts will result in better analysis and, eventually, better action and recommendations, and fewer accidents.

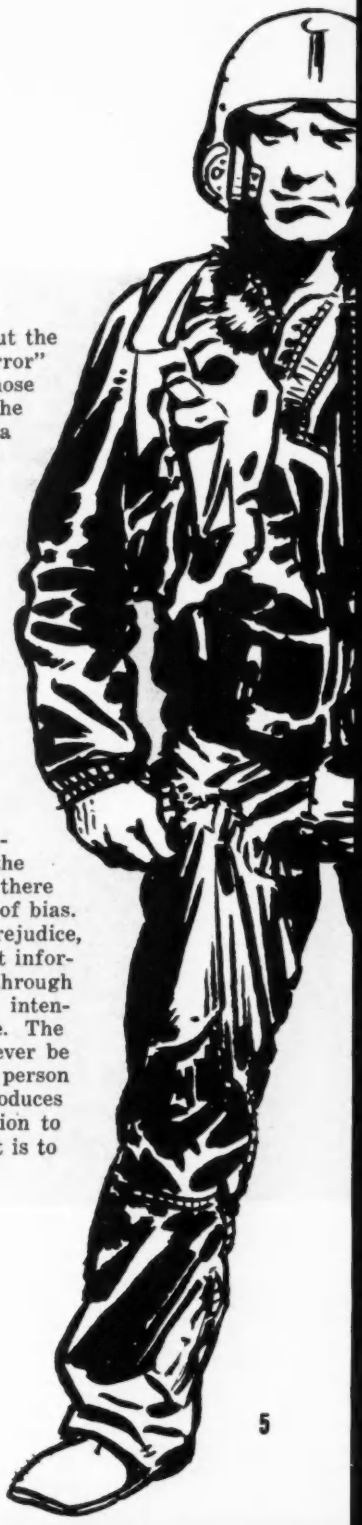
OpNavInst 3750.6C, "Navy Aircraft Accident, Incident, and Ground Accident Reporting Procedure", which becomes effective 1 July, seeks to achieve fewer accidents by providing for better reporting. The Instruction is directed primarily toward Aircraft Accident Boards, but all aviators are affected by it since it reflects some changes in accident recording and analysis which should have some long-range effects upon naval aviation safety in general and upon individual aviators in particular.

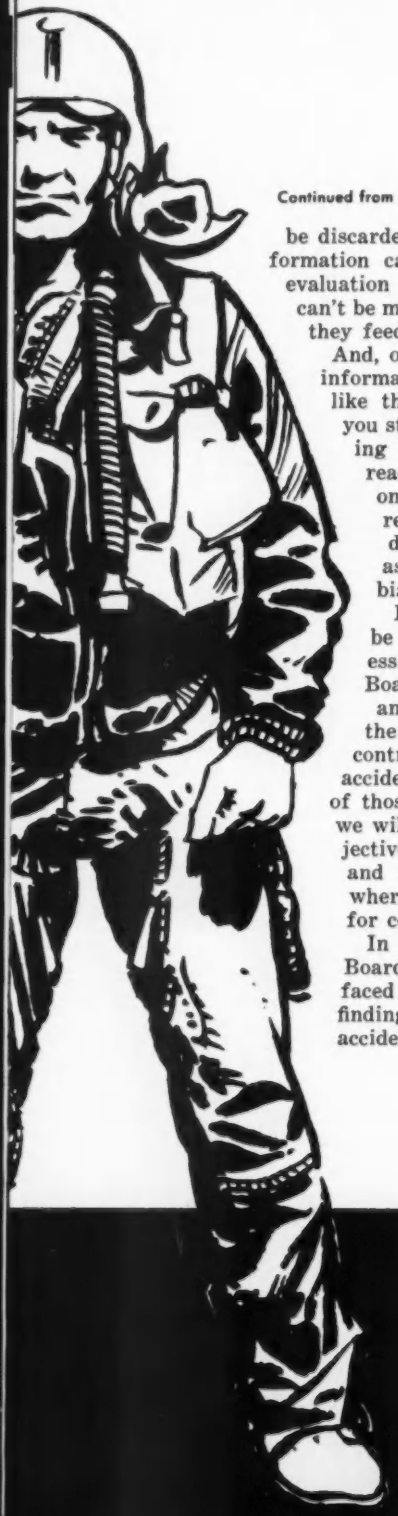
The most important change to the individual pilot is elimination of the term "pilot error," with its associated stigma, and the use of another phrase, "pilot factor," which does *not* mean the same thing in different words.

Even though it is generally recognized and admitted that man, as a human being, is capable of error without being negligent or culpable, the word "error" has, through common usage, become a bad word; it implies that a person literally "goofed," that he was capable of doing something right but instead he did it wrong. Not that pilots don't sometimes do just that, but the application of the term "error" should rightly apply only to those who do, indeed, err, and not to the pilot who was presented with a situation beyond his capability.

As is true of any change to a set of forms and precedures, the objective is improvement of the final product. In the case of 3750.6C, the final product is accident prevention, and to improve that product there must be an improvement of the information provided by the Aircraft Accident Board.

Probably the most fertile field for improvement of the information now received is in the elimination of human bias. As long as human beings continue to evaluate and report on the actions of other human beings, there will continue to be some degree of bias. Bias is not to be confused with prejudice, and is used here as meaning that information is diluted as it passes through human hands and minds. Not intentionally, but as a natural course. The analysts tell us that bias can never be eliminated entirely, for every person who gathers information introduces bias by deciding what information to pass along for analysis and what is to





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be discarded as irrelevent. Such biased information can only result in inappropriate evaluation and action, since evaluations can't be more accurate than the data which they feed upon.

And, of course, the manner of seeking information can introduce bias itself, like the old familiar question, "Have you stopped beating your wife?" Asking for a primary cause factor already presupposes that there *was* one primary cause factor. Some readers may remember earlier days when a *percent* of error was asked for—the invalidity of such biased reporting is quite apparent.

But a large measure of bias can be eliminated by removing the necessity of the Aircraft Accident Board's having to assign a primary and a secondary cause factor. If the Board is asked to find *all* the contributing factors involved in an accident, and not to determine which of those factors was the primary one, we will come one step closer to an objective gathering of facts for sorting and evaluation at a central point where all accident facts are available for comparison.

In one sense then, the job of the Board will be easier; it will not be faced with the arbitrary necessity of finding that the primary cause of an accident was pilot error and that weather, for example, was only a contributing factor.

It will be easier too, in that the Board can be looked upon more for what it actually is, a Board entirely disassociated from discipline and guilt or degree of guilt. An Aircraft Accident Board exists solely for a positive purpose, for the reduction of future accidents by finding out as much as humanly possible about each accident that it investigates.

But it is difficult for the unfortunate pilot to disassociate an Aircraft Accident Board from discipline when his accident is branded "pilot error" and he later may be subjected to disciplinary action. Even though the discipline comes from an entirely separate investigation — as it must — there is the ever-present implication that his punishment stemmed from the "pilot error" assigned by the Board as the primary accident cause.

The Charlie revision to 3750.6 goes farther toward eliminating the natural human tendency to consider a job done when "all the boxes are filled in," for, instead of asking for the primary, secondary and contributing cause factors, it asks, "What were the cause factors?" All of them, any factor

"The primary cause of this accident was other personnel error for not disseminating the information of the critical aerodynamic problem of nosewheel lift-off speed in the A4D aircraft.

"The contributing cause was the pilot trying to lift the nosewheel

in existence at the time of the accident (or before) which might have a bearing.

The Board's job will be more difficult then, in that it will be working toward an "open end" instead of toward a dead-end street. Analysts of human behavior say that when people are asked to provide *an* answer—("What was the primary cause factor?"), it's just human nature to provide an answer and assume the job to be done. Most sincere Boards don't do this literally, but figuratively there is an "end in sight" when there's only one question left and an answer is available. The "open end" should provide for more thorough, diligent and objective inquiry into possible contributing factors.

In practically all aircraft accidents, some human factor will be present—supervisory, support personnel, design, maintenance, (even in the missile age humans will contribute to some percentage of missile failures) but in a large percentage of accidents to our present-day manned aircraft, pilot factor will be one of the factors listed. The very fact that the pilot was there makes him a factor, for it means he *might* have been able to assess the situation or conditions which led up to an accident.

Note that the pilot in such a case is listed by the Board as *a* factor, not *the* primary or secondary factor. With its limited opportunity to investigate only the accidents which come under its cognizance, the Board is not asked or expected to weigh his contribution to the accident based upon only those accidents which its members have investigated or experienced.

What does such a rearrangement hope to do? Mainly, in addition to diminishing the "side effect" of the nasty phases "pilot error" with its attendant implications, it will permit analysis of accidents on a much broader comparative level. Instead of its being weighed against five or ten similar accidents to arrive at a conclusion, an accident is left free of bias until it arrives at a central gathering point for all aircraft accident information, where it can take its place in "the big picture," to use a corny but applicable phrase. It's much the same as selecting a new car design on the basis of hundreds of questionnaires rather than on a poll of four persons—the chances of hitting the right design are much greater.

Is the Aircraft Accident Board's role diminished then, under the provisions of change Charlie? Indeed NO! Rather, the

off the runway at too low an airspeed. The board concludes that the pilot did not knowingly err because he was not aware of the critical aerodynamic problem in the lift off speed of the nose gear in the A4D." —*From an AAR.*

Continued from preceding page

Board is left more freedom to serve its real purpose, to Get the Facts—ALL the facts. Its findings will not include any disciplinary implications, and should result in freer cooperation with the Board by the involved persons.

Let's review an accident which illustrates how analysis attention can be directed in the right direction if all causes are listed as contributory: An F8U-1 had gear failure and bolted; the pilot ejected — fatal. Investigation disclosed a train of events leading up to the accident.

On his first two passes the pilot was waved off, the deck was fouled by trouble with no. 4 and 5 wires. After the deck was cleared he made two bolters. His third and last pass was normal except for a slight low condition at the ramp. He checked his rate of descent and, as he crossed the ramp, visibly dropped his nose slightly and then returned it to a landing attitude.

The hook touched down forward of no. 3 wire, and the port main gear tore off. Later investigation revealed that the gear failed to withstand loads considered to be within the required ultimate strength limits.

About the no. 4 and 5 wires—a ship's electrician had inadvertently secured power to the no. 4 and 5 arresting engines while working on unrelated equipment. When this occurred, the arresting gear crew notified Pri-Fly of the electrical failure and shifted to manual control.

The men manually operating the engine valves found they could not reset for the different models of aircraft fast enough to keep a normal interval. Pri-Fly was informed that only one model aircraft at a time could be handled with anything approaching a normal interval and that if mixed models had to be taken aboard no. 4 and 5 wires would have to be pulled.

The Pri-Fly talker did not relay this information to the Air Boss in complete form, but only told him that the no. 4 and 5 engines could not be set, so the Air Boss ordered those wires pulled.

The LSO didn't have the mirror adjusted after wires 4 and 5 were out, which left a

We recognize that structural material has certain strengths under certain stress. If the stress is increased beyond the material's tolerance, we accept its failure.

Human beings have a similar tolerance to stress beyond which there is a physical and psychological breaking point. Although this tolerance may vary from individual to individual, the average can be determined. We have not fully taken advantage of our knowledge of human limitations and tolerance to stress. This is a wide open field for the psychologist, physiologist and aircraft designer.

condition in which the aircraft could not catch a wire on a perfect mirror approach.

The AAB assigned pilot error as the primary cause of this accident.

The entire narrative, containing the facts related here, does appear in the AAR, but such a narrative does not lend itself to Electric Accounting Machine coding. And the judgment has already been made—the Board determined that the pilot's error was on his last approach when he set up a high sink rate by making a late attempt at glide path correction.

Was this accident primarily caused by an error on the part of the pilot? Or was the pilot one of the factors which contributed to it? What about other human factors—LSO factor, facilities personnel (electrician and talker) factor? If this accident alone were to be used as a vehicle for seeking reduction of accidents, more emphasis would be placed on training pilots to avoid late glide path corrections. But would that be sufficient? Would you expect that in itself would be sufficient to reduce the frequency of similar accidents in the future, if all the other factors remained uncorrected?

Coding of accidents under the provisions of 6C will provide for all factors to be equally "available" on EAM cards. All accidents in which pilot and LSO are factors, for example, can then be selected as a preliminary step in determining how many of those accidents were caused by pilot technique only.

There are numerous other changes in the new instruction, too numerous to delineate here. But the changes in coding and assignment of contributory factors, while not radical nor necessarily the ultimate answer to accident prevention, are a positive step forward which can contribute greatly to future aviation safety.

For the pilot, there is "no action required," except to continue flying as safely, as professionally as possible. For the pilot and other members of an Aircraft Accident Board, there are some new "ground rules"—get to know them well, they will materially aid your contribution to aviation safety.

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THE BLACK STALLION

By CDR W. R. Moore
CNATra Aviation
Safety Office

IN THE latter part of the Sung dynasty, according to an old Chinese story, there lived a certain ruler, Li Kung-Yen. Li ruled a small but powerful feudal country in Mid-North China and he ruled it well. He was known as a firm but understanding ruler demanding homage due him, but, at the same time, he had a strong sense of responsibility toward his subjects.

Each country maintained its own army, the only effective protection against avarice-minded neighbors. Li's army had earned the grudging respect of the adjoining countries for being nonaggressive in peace but a fearless, relentless foe when aroused.

King Worried

The King, however, was worried. The last few skirmishes on his northern boundary had not gone at all well. His swordsmen had distinguished themselves as usual. However, the intruders were able to outmaneuver his troops with ease and, although the enemy had been routed, the encounters had proved costly. It was apparent that his neighbors had acquired a new blood line to their stable as his short-legged Asian mounts were no match for their fleet-footed steeds.

Li called his advisors in, explained the situation and ordered an immediate search for a new breed of horse to augment and bolster his sagging cavalry.

The search, once started, grew with amazing speed. No village was too small to be by-passed. After all, was this not for the safety of the whole country? In spite of the will and the effort, however, there wasn't a single horse discovered considered worthy of integrating into the King's stable.

In view of the seriousness of the problem, messengers were sent to all nearby friendly provinces with the same result — nothing that warranted royal attention.

Then one day a messenger heard of an old horse breeder in a remote section of the interior. It was claimed that this old man had succeeded in developing a new strain, that, if one could believe rumors, surpassed anything on four legs. It was said that his horse moved with the speed of light; when he neighed, word had it, the scream could be heard for miles; it was rumored that real fire bellowed forth from his nostrils when he was angry.

When Li heard these stories he immediately deputized a mission to search out the horse and to buy it at any price. The mission was successful and the stallion was brought before the King.

No Exaggerations

Li could hardly believe his eyes. The suspected exaggera-

tions had been understatements. The huge, black stallion stood a full twenty hands high; yet so smoothly did he move that the old King was reminded of oil flowing out of the broken jug he had chanced to witness recently after a minor accident at a royal banquet. The stallion flashed effortlessly around the enclosure with such speed as to appear unhampered by the natural laws that limit the speed of horses.

The King was beside himself with joy and anticipation.

"Send for my best horseman," he commanded eagerly.

Sung Lee was sent for and the big stallion saddled and bridled. Sung Lee vaulted lightly into the saddle and the ensuing action was difficult to describe.

One witness reported the big stallion had leaped up and then spun like a kite in a high wind. Whatever the action, Sung Lee's widow was able to draw the pension Li paid to those who died in the line of duty.

Rider after rider tried his luck and was either killed or maimed. The good King was faced with a paradox. He needed the horse desperately; yet the stallion was burying his soldiers with an ease that the enemy might well envy. It wasn't long before the volunteer riders fell off to a mere trickle in spite of the fortune the King promised the man who could ride the stallion.

Word Spreads

Word of the fierce mount soon spread throughout all the hamlets. Perhaps of all the young men who were challenged by the stallion, none were quite so moved as Lin Yoong. The thought of military service was becoming increasingly attractive to Lin and now the thought of the black stallion prodded him into action.

Leaving his ancestral home called for a time-honored ritual. The boy entered into the ceremony with eager anticipation, anxious to be on his way. Woo, the boy's father, was sorrowful; however, the old man knew that should he try to discourage the boy the whole family would lose face.

Therefore, Woo congratulated the boy on the wisdom of his choice and the honor that was sure to come to the ancestral house.

"There is, however, one promise I wish you would make," the old man said. "I want you to promise me that you will see the old horse breeder and learn everything the old man knows about the horse before you report to the King for your trials."

Lin Promises

Lin, in deference to Woo's age and experience, reluctantly agreed.

Chang, the old horse breeder, was delighted to see Lin after the boy had explained his mission.

"I have spent my lifetime breeding that black stallion," the old man said. "You are the first one to come to me for advice."

Then the old man began dragging out scrolls on which he had recorded every significant movement the black stallion had made since he was foaled.

Day after day they poured over the records. At the end of three months Lin knew every movement the big stallion had made and could be expected to make. He knew the pressures and signals that the horse understood and he was able to detect a definite pattern of movement so that it was possible to foresee the stallion's actions. At last Chang declared the boy ready and Lin set off at once for the palace.

King Consents

The King reluctantly gave permission for the trial, almost sure that this fine-looking youngster would tread the path of the others. The usual crowd gathered around the enclosure — hopeful yet willing to be entertained by the usual grisly sight.

The black stallion was led in and the crowd grew silent in awe of this spendid animal. Lin stepped into the enclosure and leaped lightly on the stallion. The rider and the horse became one. The boy flicked the reins and the huge beast whirled. Lin called for a jump and the mount was up and over, barely breaking his stride.

Lin put the stallion through all the paces Chang had so patiently taught him. To the watchers it seemed impossible that such strength and speed could exhibit such grace. It reminded one of the summer dancers performing in the Moon Room.

The boy finished the demonstration, swept up to the King with a flourish, bowed low and said, "We are ready to serve you, Your Majesty."

The old King embraced the boy and with tears in his eyes said, "My son, rejoice with me, for this day has witnessed the beginning of the end for tyranny and bloodshed. Our enemies will soon find that it is far more profitable to deal with us peacefully than with the sword."

Invaders Defeated

The rest is history. When the northern tribes united to split the kingdom and sack it, Lin on the black stallion virtually single-handedly broke the advance.

He was everywhere at once. So swiftly did the pair move that the enemy swore there was a regiment of these fierce, thundering demons. Slashing, cutting, disorganizing the leading troops, hacking the supply line, Lin soon convinced the northerners that there were easier ways to prosper and the rout was complete.

The grateful King gave the boy half of his kingdom and the hand of his youngest daughter. And they lived happily ever after . . . •

LOST & FOUND

by
CAPT G. W. Evans, USCG

A young jet aviator departed from his home base up north for a weekend training flight to the south. He was one of a flight of several aircraft. He never did quite catch up with the flight leader, but continually advised that he was 30 seconds behind. When his ETE was up and he had still not sighted his flight leader, he figured he should be over his destination. It was early on a Sunday afternoon. He was on top at 38,000. He was not sure of his position, and not sure of his compass. Fuel remaining: about 50 minutes. Actual weather at his destination was CAVU; at his actual position, 6000 feet and 6 miles.

He declared an emergency. The DF-Radar Net came to his assistance, passed steers, fixed his position, and dispatched an escort. Things should have proceeded to a logical simple successful conclusion. But, they did not.

For the next *46 minutes*: the pilot shifted frequency four times, worked four different ground stations, changed course six times, and seemed unable to decide on any plan of action. The escort aircraft, after closing to within a few miles of the distressed aircraft, lost pressurization and returned to base without advising of this fact until in the landing pattern. The

distressed pilot exhausted his fuel in position 85 miles inland. Radio and radar contact was then lost. He glided through the overcast, broke out near the coastline and headed for an emergency landing field. He came within one mile of making it.

Three days later search aircraft located him, crashed and dead in the cockpit. Cost: one life and one million dollar jet aircraft.

Fortunately this type of accident does not happen every day. But, it does happen frequently. In many cases the pilot can save the day by the use of simple common-sense lost aircraft procedures, one of the important parts of flying safety. The pilot may know his machine perfectly, be an expert airways and instrument pilot, and a fearless combat man — but these qualifications may all be for nothing if he does not know lost aircraft procedures. Even the "expert" can become disoriented at times, and with high performance aircraft, high altitudes, high speeds, and high fuel consumption, he does not have time for guess work and hit-or-miss procedures to get his machine aimed at the nearest airport. He must automatically and instinctively know correct procedures, and carry them out calmly and deliberately.

In distress cases involving lost aircraft or critical fuel situations, the record clearly shows that there are two basic causes for those accidents which *should*

To point up the effectiveness of SAR as a means of reducing accidents, a study of some 100 accidents was made in which the pilot became disoriented or lost. Fifteen of those accidents would not have occurred if the pilot had used the SAR net properly! In most of those cases, "properly" meant *in time*—early enough to permit coordinated action to provide calm, reassuring information.

". . . you can be confident that he has definite procedures for orienting you and aiming you toward the nearest suitable airport."

have been safe landings. They are: (1) incorrect emergency procedures by the pilot, and (2) ignorance by the pilot of the ground facilities available to help him. There are cures for these causes, and they are, of course, education and training.

In a lost aircraft situation, the pilot's first question to himself is: What do I do? If he knows the answer to this one, he is well on his way to safety. However, en route to that nearest suitable airport, there may be distractions. The pilot needs a good basic foundation in the principles and problems involved in getting him down. Therefore, let us consider these questions and attempt to answer them.

What should I know?
What do I do?
What happens then?

What Should I Know?

In the first place, the pilot, who has at stake his own life, a million dollars worth of flying machine, and a hundred thousand dollars worth of training, must *know* that he can never let "professional pride" delay a request for assistance when he feels doubtful of his position or safety. Ground radio, radar, and DF stations are ready and able to help. There is absolutely no penalty for using them. Delay has caused crashes and cost lives! Take action!

The pilot must realize that he "loses no face" in such a situation. We will only call it a practice steer, if you like. But let's get you down in one piece. Your ground radio link will classify your situation as one of the following emergency phases, depending on the urgency:

Uncertainty: Doubt exists for your safety or position.

Alert: Apprehension exists, or continued lack of radio contact with you.

Distress: Grave danger threatens you.

You, the pilot, may indicate the emergency phase if you wish.

The pilot must *know* that he can declare an emergency by: (1) Emergency IFF, (2) Sending emergency message, or (3) Flying the triangular pattern when he does not have 2-way radio. (We are advised that radar detection of a triangular pattern is not reliable; therefore, a good operating IFF on all squawks is good life insurance.)

In any potential emergency situation the pilot must know *THE FIVE C's* if he is to carry them out—

1. *CONFESS* your predicament to yourself; admit that you are lost and could use some help. Do not wait too long; give the ground stations a chance to help you while there's time.

2. *COMMUNICATE* with your ground radio link and pass as much of the distress message as possible on the *first* transmission, and in the correct sequence. If communications is lost for any reason, your ground link may at least have your identification and position. The GUARD channels (121.5 mc VHF, 243.0 mc UHF) are reserved for aircraft emergency use. All too often they are misused for routine

communications. You can help your own situation by firmly asserting your priority on the GUARD channel and asking other users to vacate the frequency.

3. *CLIMB*, if possible, for better radar and DF detection. Ask for emergency ARTC clearance.

4. *COMPLY*—especially COMPLY—with the advice and instructions received if you really want help. Assist the ground "communications control" station to control communications on the frequency on which you are working (as that is the distress frequency for your case). Ask interfering stations to maintain silence.

5. *CONSERVE*, slow down, set up maximum endurance power. You needn't be in a hurry now. Find out where to go, then set up maximum range power.

And we might circumscribe all five C's with another C: *CO-OPERATE*. Stick with your ground link unless some compelling reason warrants a shift. Shifting frequency and shifting stations has caused many crashes.

So, we can say, the pilot mainly needs to *know:* the importance of a prompt request for assistance, and the five C's to safety. He is next concerned with the answer to:

What Do I Do?

The pilot has only three simple things to do:

(1) Switch IFF to "Emergency."
(2) Transmit the emergency message.
(3) Comply with instructions received.

If you do these three things, you are almost guaranteed a smooth descent to a safe landing. If you don't, you are due for a rough confusing tumble to the wilderness.

Radar stations are particularly sensitive to the emergency squawk on IFF, will pick up your signal, and pinpoint your position at long ranges, if you have altitude.

The emergency message should be committed to memory and repeated to yourself on every flight so that you are ready for immediate transmission when a critical situation arises. The various parts of the emergency message should be transmitted in sequence. There is a definite reason. Here is the message. Memorize it!

(1) MAYDAY MAYDAY MAYDAY (if distress), or PAN PAN PAN (uncertainty or alert). (If CW transmission, use SOS for distress, and XXX for uncertainty or alert).
(2) Identification and type aircraft (Navy 12345, F8Z).
(3) Estimated position, course, speed, altitude. (Over __, course 120, Speed 350, Alt. 35,000).
(4) Fuel remaining in hours and minutes. (Fuel aboard 55 min).
(5) Nature of difficulty. (Lost AC power).
(6) Pilot's request and intentions. (Request steer to__ and ATC clearance for emergency penetration).
(7) Two 10-second tones with mike button, and identification. (_____ Navy 1234 over).

On a recent jet bailout, the pilot called MAYDAY, gave his identification and then used up valuable seconds describing the rumbles in his engine. He bailed out without giving any estimate of his position, course, speed, and altitude.* The ensuing search covered a rather large area and the pilot spent an uncomfortable night in cold water. So, as we study the *sequence* of the distress message, we conclude that a definite priority of transmission is important. Give us your distress phase first (MAYDAY or PAN); then, your identification (so we know who); then, your navigational data (position, course, speed, altitude); then, your remaining fuel; then, a little data on what's wrong and what you want; and finally, transmit for DF bearings.

CAPT G. W. Evans, USCG, the author of "Lost & Found," a 1935 graduate of the Coast Guard Academy, took Navy flight training in '41 and was designated a CG aviator. During the other big war he served at various CG air stations and on North Atlantic patrol from Greenland and Iceland. Since then he's been at War College, in Washington as CG War Plans Officer, and was CO at CGAS, St. Petersburg, Fla. prior to becoming SAR Officer for 5th CG District in 1955.

Parachutes used in certain Navy contractor aircraft and some A.F. aircraft now contain chaff (placed in the second fold) as an aid to radar plotting after ejection. Radar operators should be alerted to the possibility of seeing this chaff on their scopes. NASC is most interested in receiving early reports of occurrences where chaff is used or seen.—Ed.

The third thing which the pilot must *do* should be the easiest, but experience shows it to be the frequent cause of a crash. The pilot must *comply* with the advice and instructions offered if he really means business. The pilot must help his "communications control" station to maintain radio discipline by silencing interfering stations. He must stick to a *plan of action*. Shifting frequency, shifting to other ground radio stations, and following no plan of action have caused many unnecessary crashes.

After the pilot has done the

Continued from preceding page

three simple things expected of him in a lost aircraft emergency, he has an interest in:

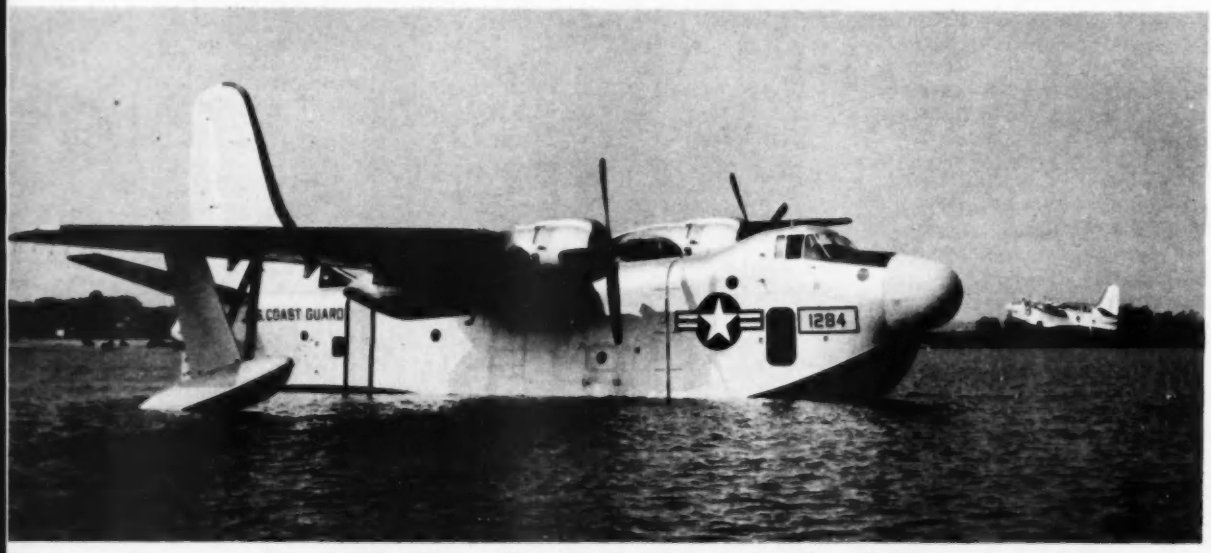
What Happens Then?

Your ground radio link in a lost or emergency situation is any ground communication station, normally the one you happen to be working at the time. It might be a Navy, Coast Guard, Air Force or CAA station; it might be part of a radar/DF net, or it might be an individual station with limited radar or DF facilities, in which case its hotline communications with other station on the net will still enable the use of the coordinated efforts of the entire net. If you are working an isolated station, they might ask a net station to communicate with you, in which case the net station will become your ground radio link after positive communication is established.

Whatever station you first communicate with, you can be confident that he has definite procedures for orienting you and aiming you toward the nearest suitable airport. He needs *your* cooperation. Regardless of the identity or hook-up of your ground radio link, he will follow five basic principles in getting you down. You should also have an appreciation of these five principles. Each principle can be expressed as a simple word: Information, Communications, Steer, Fix, CAA-GCA. If you, the pilot, understand the importance of these principles you can better cooperate.

(1) *Information* is definitely needed to start action. Your emergency message and IFF squawk furnish information. You may be asked to shift to another, less crowded frequency for a DF bearing and your transmission is the information needed to obtain a bearing. And for radar positions, we need enough information to single you out from the other aircraft in your vicinity, so if you can tell us your IFF mode, course, speed and altitude it will save valuable time in identifying you.

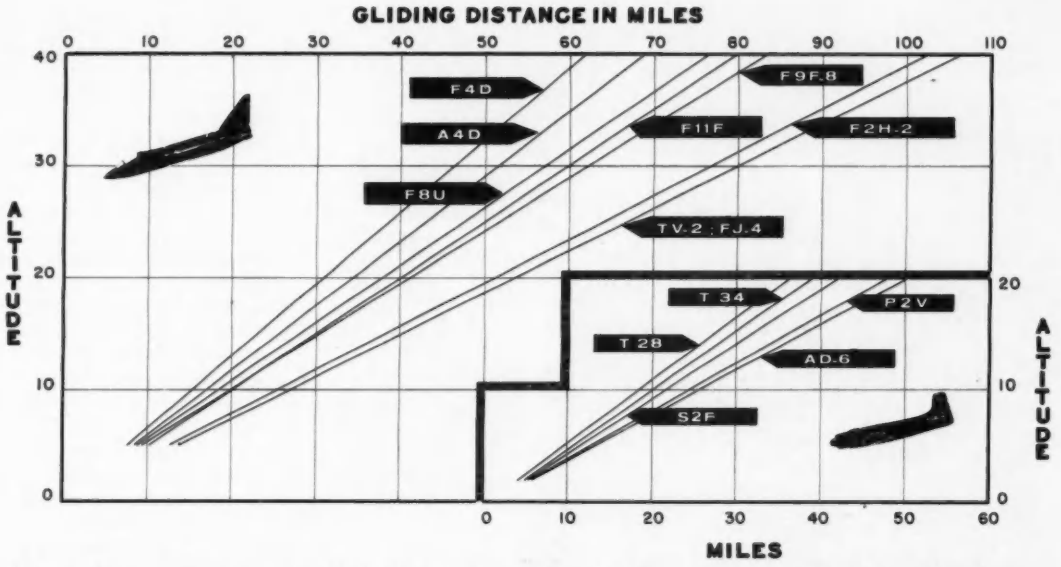
(2) *Communications* must be maintained with the pilot. Interfering stations must be silenced. Pilot must be reassured. The guard channels (121.5 or 243.0) should be used, if practicable. If not, use any frequency and clear it for the emergency traffic.



Pilots who don't call for SAR assistance early enough can still help themselves by transmitting enough information to localize search by rescue aircraft.

(3) *Steer* must be determined and passed quickly to the aircraft, and the pilot must acknowledge the steer being followed. This is a preliminary steer to get you aimed in the right direction, after which multiple bearings can be taken to obtain your fix.

(4) *Fix* is obtained by radar plots and DF bearings. After the fix, the dis-



SAR controllers may wish to retain these "dead-stick" gliding ranges for handy reference. It should be noted that while these figures are taken from the various handbooks, they do not take extremes of weight into account, and are therefore only approximate.

tressed pilot will be steered to nearest suitable airport commensurate with the current fuel and other situations.

(5) *CAA-GCA* completes the assistance to the pilot. The communications control station will quickly obtain ARTC emergency clearance, will alert GCA at field of intended landing, and pass weather to the pilot. "Hand-off" of communications control to the station of intended landing will be made at the proper time.

The service rendered to you, as a "disoriented" pilot, by an individual Radar or DF Station may be sufficient to get you down safely. But in some cases, the coordinated efforts of several stations linked by hotline telephones may be necessary. A coordinated effort is particularly important when the fuel situation is critical. Your position must be *fixed* quickly, and you must be steered to the nearest *suitable* airport.

An example of a coordinated DF-Radar Net is the one serving the Maryland - Virginia - North Carolina area. This is the Norfolk DF-Radar Net. There are five stations on the North Leg with NAS, Patuxent River as Leg Control. There are twelve stations on the South Leg with the Fifth Coast Guard District Rescue Coordination Center as Leg Control and over-all Net Control. Figure one is a diagram of this Net. For the calendar year 1957, this Net has a record of 21 probable saves and 23 possible saves with an estimated value of saves of approximately 32 million dollars. The coordinated efforts of Net Stations rendered material assistance to 246 aircraft during this period.

It is apparent that the business of taking *action* in a lost aircraft situation is indeed a simple common-sense process, but one which does deserve a good basic foundation in the principles involved and in the actions to be expected. The pilot should now be concerned with this question:

What Now?

Use this material in your squadron's flying safety program.

Commit the 5 C's to memory—you can't use them unless you know them.

Don't stand on "professional pride" if you think you are lost.

Commit the emergency message to memory, and repeat it to yourself on each flight.

Know the DF and Radar stations in your area, and how to contact them.

Remember the five basic principles in assisting a lost aircraft.

And finally, you have a great responsibility to your Service, to your country, to your family—carefully plan every flight, deliberately execute every detail of that plan, respectfully recognize the limitations of your flying machine and of yourself; and if, even after doing all these, you inadvertently become "disoriented," execute these simple lost aircraft procedures carefully and promptly. You may be surprised at the possible results. •

THOROUGH CHECK

A hairy landing in an F8U is a sight to behold, and when one of this squadron's pilots landed in a multiple sort of way, everyone was ready to give him the old hee-haw on his technique. However, when he emerged pale, shaken, and mumbling a story about control failure, we realized we had nearly seen a fatal accident.

It seems that he had lost his roll stabilization in flight and had turned this system off. At the break PC-1 pressure dropped to 1600 psi, but since PC-2 was normal he elected to land without extending the Marquardt. In the groove the pilot experienced a left wing drop, and suspecting jet wash, took it around. On the next pass, with the Marquardt extended and PC-2 reading normal, he got a left wing drop just before touchdown, hitting on the left main gear and blowing the tire. The plane bounced into the air nose-high then settled back on the right main gear and ultimately into a three-point attitude. The pilot described the rollout as uneventful.

The pilot downed the plane for loss of PC-1 pressure and commented that just before touchdown the stick felt frozen with no aileron control. At this point our story becomes of interest to other mice. PC-1 failure is not exactly uncommon, and after the hydraulics gang had replaced the faulty pump, the bird checked out perfectly. Only one more thing to check out—the

pilot's comment about the stick being frozen.

You know how it is—plane "ground-checks OK" but we really can't tell whether it was the stick, the pilot's strong right arm, or his head that was locked. The plane could have been placed up and flown right here. However, since PC-2 should have provided full control after PC-1 failure, this system was checked and the system flushed. Chips and filings were discovered in the filters. "Bravo! Tenacity had paid off and the trouble had been found. Let's fly, we need the time. Safety pays, eh what, Mouse?"

The maintenance officer refused to put the plane "up" however. If the pilot had experienced loss of aileron control, a few chips and filings weren't a satisfactory answer. Furthermore, how did they get there? He issued a work order to pull the port aileron package and send it to O&R for disassembly and inspection.

"Egads! What for? The plane will be down for another month! Let's get them in the air!"

A few days later, O&R returned the package, and more important, the last piece of the puzzle. The piston on the PC-2 side had parted from the rod assembly due to failure of the rod at the thread. As long as PC-1 functioned correctly no defect was apparent in either system. Upon failure of PC-1 though, PC-2 could not carry the load.

This plane could have been placed up and flown successfully at several points in the course of its repair. Only the maintenance officer's insistence that something was wrong prevented a repetition of the same hairy landing, or worse.

Maybe this story will reinforce the idea that "Ground check OK" is too often not good enough.

BOOST BUST

I was flying parade wing on my division leader with six feet of stepdown between our A4D-2s (we were in a 30-degree bank at 300 knots) when the plane rolled without warning violently toward my leader's aircraft. A "freezing stiffness" of the stick followed. I pushed over to miss the other aircraft.

The aileron power boost system malfunctioned (with no hydraulic warning light indication) and the follow-up trim tab (which was 3 or 5 degrees up into the windstream) took over and rolled the aircraft to port toward the other aircraft.

After I pushed over to miss the leader I found myself heading toward the deck from 4000 feet at 350 knots. I used much force to get straight and level. I checked my follow-up trim tab flush and pulled the emergency boost release cable and made an immediate straight-in landing.

SLIGHTLY HAIRY

We had taken off at 2300 for a night ASW exercise as participants in an overseas fleet exercise. The night was dark but quite clear. Our P2V-7 was assigned to a destroyer to investigate contacts but things were fairly quiet so we were merely being vectored by the ship.

There were numerous small islands in the area; we could barely see their outlines on the water but it was too dark to identify them. The elevation of some of these was as high as 2500 feet according to our area charts. As we were operating at 1000 feet this point was brought to the attention of the controller on the destroyer. He assured us we would not be vectored near any large islands.

While following one vector I could see we were going to pass over an island but I figured the ship knew what they were doing. However, as we passed over the center of the island I looked out the port cockpit window and what I saw made my hair stand on end. We were no more than ten feet off the deck, paralleling a stone wall. If I had lowered my main mounts we would have touched.

An immediate application of power and full back pressure on the controls and we climbed over a ridge. Another ten seconds and we would have been nicely blended into the landscape. We spent the rest of our patrol at 6000 feet.

Anymouse continued next page

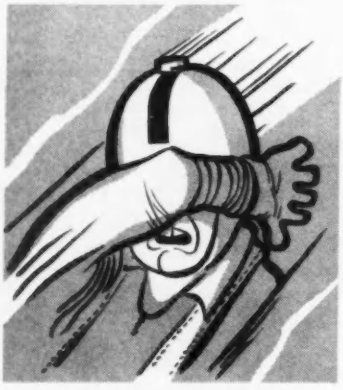
ANYMOUSE

and his hairy tales

Continued from preceding page

PENETRATION, OR SUICIDE?

ON MY last three hops in swept-wing jets I have been led into three "bore-your-own" penetrations. Flying on a VFR clearance when there are several layers of overcast present must not be too dangerous as I don't believe I have read of many mid-airs coming from such doings. However, it just doesn't seem that the law of averages will permit this sort of thing to continue forever without an airplane covering the "hole" in the overcast as we climb through and letdown through at 450 knots.



The "2000 feet horizontally" requires a pretty big gap—almost a mile wide hole in the cloud deck. I suppose if I didn't like to take chances of sorts I wouldn't be participating in the program but, we have an obligation to provide a bit of tranquility to other airspace users.

I'd like to make a plea to all flight leaders right here and now to be sure you can stay VFR when on a VFR clearance. I believe it takes more fortitude to do this even than it does for "Ole Wingy" to hang on with you—right into eternity.

#-!x-!!—*Both the record and the law of averages testify to this mid-air hazard—you are definitely required to stay VFR if you are only VFR cleared.—Headmouse.*

REPEATER

It is still happening! I was assigned to the check crew which was designated to make a high power turnup of one of our F9F-8's. We went through a normal check of intakes and fuel drains, but we neglected to check the throttle hookup in the oxygen access door (it had been disconnected to remove the oxygen cylinder).

I noticed a lack of sponginess in the throttle but decided to wait until after shutdown to adjust the cushioning. After lightoff the engine accelerated rapidly to 100 percent. Realizing I was unable to control the engine, I yelled "Runaway engine!" but by this time the other mechs had fled. Quickly I shut off the fuel master switch.

Luckily I had chocked and tied down the aircraft and had adjusted the brake pedals to my reach. There was no overtemping and it was determined later that the engine was not damaged. Sure, nothing serious resulted, but this situation had all the ingredients of a "jam-up" accident. You can be sure that I'll never light off another F9F without first checking the throttle linkage.

Newcomers may want to check the classic yarn of this type—Time Zero, May 1956 APPROACH—*Headmouse.*

SPEEDBALL

My third fam in the *"Panther-Five"* was scheduled with the units toughest instructor as chase pilot. My reaction was an unusual amount of preparedness and desire to please the rough tiger so I listened attentively ("above average mental attitude") to the briefing and as we manned aircraft I decided a sure way to impress the chase pilot was to beat him out of the chocks. My 12 hours of cockpit time and 3.1 in type were just enough to get me to warmup area ahead of him (920 hours in F9F's).

A normal takeoff, climbout, and level off at 25M was accomplished with lots of noisy, chipping help from my airborne chaser. Then the usual things done on a fam hop (slow flight, etc.) before we tried power off stalls. My first attempt to recover did indeed bring down the wrath of Chase. Vowing to do better I put my all into a second recovery and pushed the nose over and added full throttle with unequaled speed. Alas, a loud rumble, falling rpm, a loss of aileron boost, and a fade in the chipping on channel 15—a flameout!

The procedures so thoroughly pounded into my thick skull produced a glorious relight and a tension easing rise in rpm. Then

the chipping again and a neat comment—"That was lousy, you lost 5000 feet in that recovery!"

I confessed my flameout to the suddenly speechless chase pilot and he nursed me home more scared than I. An uneventful precautionary flameout approach and landing followed. In debriefing I was admonished for committing the "unforgivable among jet pilots," a flameout, by Chase. What a shock. Just when I thought I was the Ace of the Base for making an airstart. But he did give me an "Above average, expeditious checkoff," and the rest of the boys thought I was great.

A 2.5 test hop on my F9F-5 couldn't produce a flameout and everybody wonders why — except me! That "above average, expedi-

tious checkoff" is why. I forgot to reset my primary fuel control. Sure, Zilch headwork. I'm not too expeditious anymore.

TRANSIENT SQUAWK

Shortly after takeoff in a TV-2, while climbing in the soup, my generator warning light came ON. I immediately broadcast Mayday to the Center, announcing my intentions of trying to locate an air station down the coast which was reporting a broken ceiling. Top of the overcast was 5000 feet and upon breaking out I dropped my gear, flaps, brakes and turned off all unnecessary electrical equipment, then advised the Center I would head seaward and bail out if unable to locate the air station and make a VFR landing. The battery went out just after this transmission and I now only had a mag. compass and VFR conditions on top of a solid overcast (with some mountain peaks in the distance).

Twenty-five minutes after takeoff I found the air station sitting below a broken layer and made a successful emergency landing. Here is where my story really begins.

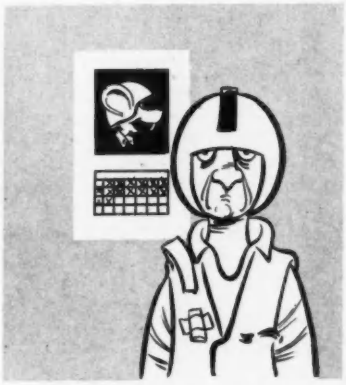
The heavy landing load conditions and necessary braking action had succeeded in wearing the main gear tires down to the cord. I made a report of my emergency to Operations and filled out the required work request chits for two tires and a new generator. Then RON.

The next morning my aircraft was waiting on the visiting aircraft line for my proposed dawn takeoff, but during preflight I noticed that the tires had not been changed as requested, though the generator was installed. By now it was Sunday morning and the duty maintenance crew took all day to fix the tires. Another RON.

On the morning of the third day, preflight was completed and I rolled into position for another IFR departure: Engine to 100 percent, check for lights—wham! Another generator failure. And so I taxied in and filled out more chits. The new generator was installed by late that afternoon, but the runup revealed fuel pressure fluctuation and the trouble could only be remedied by replacing the main fuel control. Another RON.

The next day work progressed toward getting the aircraft ready but another RON was required. All of this was with only one change of uniform.

I was informed that the aircraft was ready on the morning of the fifth day. I went through the preflight as I have never gone through one before. The start was normal but I had no radio contact. I was advised by runner that I was



parked in a known "blind spot" and that I was cleared to taxi to the duty runway for another radio check. No contact so I taxied back to the line and shut down. Another radio set was installed with no luck so a thorough check was made. The main coaxial cable running along the fuselage below the engine was disconnected at one point. With this trouble remedied I was able to depart at last.

I had planned to cruise at 37,000 feet but noticed on climbout that as I gained altitude the cabin air became cooler and I was beginning to get cramps. A check of the cockpit showed no cabin pressure. The oxygen and other instruments were normal and the weather CAVU so I decided to continue on my flight and refiled enroute to arrive at a large Air Force base. This decision was based on the known reputation of this base for their expert TV-2 (T-33) maintenance.

After landing, maintenance was requested immediately. A short time later a mechanic came in to inform me that my pressurization had not been connected properly and that he found a pair of pliers in the nose section near the pressure system. Another good preflight revealed everything normal and I took off for my home base. This leg of the trip was uneventful and I left word to give the plane a complete check the next morning. The check was made with the following results:

Found in the tail section:

- one long nosed pliers
- one 8-inch screwdriver
- numerous pieces of used safety-wire

Found in the nose section:

- one wrist watch (the Air Force mechanic's)

In view of the findings it was decided that a complete 30-hour check would be done even though the aircraft had only flown a little over 12 hours since last check.

This check revealed the thermocouples not wired for proper reading; the rudder control cable connectors were only single safety-wired and not double-wired* as they should have been. It was suspected that the fuel control diaphragm had never been presoaked as required before installation.

In the opinion of the local experts the discrepancies found would not normally be spotted by a pilot on his preflight check or even a trouble shooter, without removing the tail section or digging deeply into the nose in search of some suspected trouble.

* See Safety Wire feature, page 36—Ed.

The purpose of Anymouse Reports is to help prevent or overcome dangerous situations. They are submitted by Naval and Marine Corps aviation personnel who have had hairy or unsafe flight experiences. As the name indicates these reports need not be signed. Forms for writing Anymouse Reports and mailing envelopes are available in readyrooms and line shacks. All reports are considered for appropriate action.

HEADMOUSE

Dear Headmouse:

Why in #%*%@☆ do they clutter up the GUARD channel like three tables of ladies' bridge? There's rules about it, we harp about it, and pilots lose their wingmen while doing it, and STILL they yak and chatter on a channel that's officially designated EMERGENCY.

It's happened before, in a different model plane, different altitude, but the same situation—but read on and you'll see why I'm overspeeding 110%. In this case it was an F8U: he flames out at 37,000 above an overcast over a large city. He wasn't too shook and did a pretty good job of trying to airstart, but it wouldn't go. When he couldn't light off in emergency he squawked emergency and called his squadron base radio.

Why didn't he open up on GUARD channel? His expressive reply was "H___, you know what it's like on GUARD channel around here you hear everything from Ground Control to half a dozen ground stations all answering up at once and asking for a third repeat on your BuNo. Heck no, I wanted some good help and in a hurry."

Well, our hero was talking with the squadron and trying more airstarts when a GCI station came up on GUARD and said they were reading his squawk. So, *with considerable reluctance* (his own words) he switched to GUARD, stated his troubles and asked for a posit. GCI came right back with a posit BUT IT WAS BLOCKED OUT BY OTHER STATIONS! Story ends with the pilot breaking out of the soup, establishing his own posit, heading away from the city and pulling the curtain. He did a good job of pointing his bird away from the city too—they had one jungle-buster of a time getting to it in the tuleys . . .

Doesn't discipline, or the threat of it, mean anything in this military organization any more? . . . People stop at an intersection when they see a yellow STOP sign because they know they're supposed to, or because they're reluctant to have an audience with the judge. Doggone it, we use the UCMJ to punish people for being AOL half an hour, why doesn't military discipline extend to people who threaten their buddies' lives by gabbing on an emergency communication channel?

Isn't "misuse of frequency" a violation of something? . . .

MAD

Yes, the threat of discipline is always available, but isn't the threat of having no useable channel on which to shout "Mayday" a greater threat? Not that discipline isn't appropriate, especially in those cases where a flagrant and deliberate use of GUARD is made and where the culprit(s) can be identified. But methinks education is the answer—positive education to convince people that they're actually doing something GOOD by staying off GUARD, and negative education to convince them that they should feel a deep shame and guilt whenever they use GUARD for idle chatter. Discipline can have a negative effect, making a youngster apprehensive about using GUARD when he has a legitimate reason. We don't want that.

Then too, there are occasions when GUARD can be used with discretion and without hurting anyone—like when the tower doesn't read you UHF and you check that GUARD is clear, then come up just long enough to say "give me a call on 250.6." Wouldn't want to call that a "violation" for disciplinary purposes—seems like a near-legitimate use of an emergency channel. There wouldn't—or shouldn't, be any need to even consider disciplinary action for misuse of GUARD if everyone concerned, pilots, radiomen, and tower personnel, realized that the situation described could just as easily have been caused by them.

Guard it, but don't disregard it . . .

Related subject: What did you think about this F8U pilot calling the boys away from their acey-ducey game instead of calling the tower? Heard complaints about this practice from several quarters. Sure, it's comforting to talk to your locker-mates and they can give you helpful advice on how to shut down that blankety-blank cockpit heat, but they can't give you a steer to an unpopulated ejection area and alert the SAR net. The tower can't do it either if they don't know you're in trouble, so if you need the coordinated emergency efforts of the Navy, Coast Guard, and Air Force, you've got to shout where they're listening.

Once you have an emergency your problem is bigger than the squadron, it's a U. S. Navy problem. Give the squadron a growl if you have time, and have them send someone to the tower, but then for gosh sakes get onto tower freq and cut them in.

The tower has dropline communications with ATC and rescue centers, direct communication with crash trucks and other rescue and command vehicles, and can still let your squadron airstart pro talk you through another try.

Boiled down to the bone then you can sum this up in a few easy-to-remember guidelines:

Guard the GUARD channel.

When you NEED GUARD channel, USE it.

And when you don't NEED it, STAY OFF IT!

Base radio is fine for squadron business, routine assistance, etc. but when an emergency is imminent or upon you, LET THE NAVY KNOW!

Helpful hint on aggressiveness: In an emergency like the one recounted earlier, everyone wants to help.

But, you're the one with the emergency—take command of your situation early, state loud and clear that you want to talk to only one station, and identify that station, ask everyone else to GET OFF GUARD and to do their communicating on landlines or other channels . . .

Very respectfully,
Headmouse

PS. Please see LOST& FOUND, page 12.

Shear Wire SNAFU

Dear Headmouse:

One of the preflight items checked by the pilot on P2V aircraft is the safety-wire holding the J-hooks on the landing gear. The primary reason for this is to insure that .040 shear wire of the soft copper variety is used (HMI, AN-01-75 ECA-2, Page 166). This constitutes a safety-of-flight item since this wire must be broken to lower the landing gear manually, and the J-hooks are inaccessible to the plane captain while in flight. In the past, instances have been reported of the use of high tensile wire that cannot be broken while in flight.

Recent preflight inspections have revealed the use of bright safety-wire that has the appearance of the steel or nickel variety. In most instances the wire has proved to be soft copper, but this is difficult to ascertain on preflight since the wire is not conveniently located to be tested by bending.

The only bare copper wire listed in the ASO catalog for safety devices is .020 diameter. The only .040 soft copper wire listed is solder coated. This is listed in section 2201, page 6, Item 203.

A check with O&R Alameda revealed that they were using soft copper wire (uncoated) listed in the Federal Stock Catalog. This is stock no. GX6145-236-9491 reference FSC, Group 61, page 53, Item 7425. Because the high tensile strength wire and the solder-coated wire are very similar in appearance it is felt that a safety-of-flight hazards exists.

It is recommended that:

a. Soft copper wire be procured in its natural color to preclude accidental substitution.

b. The bright colored variety either be withdrawn from stock or the present supply exhausted in other than aviation use.

c. .040 soft copper wire be included in the ASO Catalog listings.

d. All aviation activities requiring .040" soft copper wire be advised that it is available as a General Stores item.

e. All activities be advised of the similarity of appearance between the plated soft copper wire and stainless steel wire with a high tensile strength and further that they be instructed to carefully control the issue and use of the two types of wire. Adequate safeguards must be established to ensure that the identity of wire is maintained and that the proper wire is used.

VP CO

Because of .040 uncoated copper wire usage outside the aeronautical branch it was already stocked as a General Stores item and has a "G" cognizance number rather than an "R." As of Jan. 1957 ASO-procured items which also have usage in more than one Government agency were assigned Federal Stock Numbers. ASO Catalog 0008 of Jan. '57 contains a cross-reference listing of ASO Stock Nos. to FSC Stock Nos. Please turn to page 43 for a listing of stock numbers for wires commonly used in naval aviation and to page 36 for more information on safety, lock, shear, and seal wire.

Very resp'y
Headmouse

truth and consequences

A DIGEST OF SIGNIFICANT AIRCRAFT ACCIDENTS

ANTICIPATED PASSAGE ____ "Navy ____ reported passing through 6000 feet and stated at that time he believed his aircraft to be damaged but did not know . . . At 2243 Navy ____ reported leaving 5000 feet. This was the last known transmission from him . . . approach control called for the next 10 minutes with negative results. Nearly two weeks later, a search helicopter sighted what was later

definitely identified as Navy ____ on the 3800-foot level of a 4000-foot mountain.

"It was believed", noted the accident board's analysis, "the anxiety created (by a near miss) caused the pilot of Navy ____ to miss the Omni passage which occurred only a matter of seconds after he had righted his aircraft on course. At 2232 he called ____ airport, knowing that he had deviated slightly from course and seeing that he was going from the Omni station, estimated his time abeam as 2230 . . . In reality he was abeam the Omni station at about 2225." This was determined by computing ground speeds and upper winds from position reports and revised estimates of various aircraft in the vicinity. An increase in wind velocity and possibly in direction resulted from these calculations.

"The pilot of Navy ____ continued on course from the Omni station . . . then decided that he might have damage to his aircraft and had better return to the airport and check. He immediately started circling in an airspace that he believed to be about two minutes east of the Omni station . . . all the time drifting with the rather strong westerly wind.

"Upon receiving the clearance Navy ______ turned toward the

Continued from preceding page

Omni station and selected his Omni radial . . . estimating that he should fly for two minutes to bring him back over the position where he assumed the Omni station was. The birddog was tuned in on the low frequency range . . . Flying the Omni heading for two minutes, the pilot called the airport and reported over the Omni station at 2237, 9000 feet. Having received the weather at the airport as 5000 feet overcast, visibility 10 miles, the pilot's one thought now was to let down on the low frequency range and break out into the clear for a VFR approach.

"He assumed at this time that he was over the Omni station and disregarded his indicator from this point on, concentrating on his letdown and the birddog to the low frequency range.

"The actual position of Navy ____ when he assumed he was over the Omni station was approximately 20 miles east of the station. Beginning at or near this position, the pilot let down at a descent rate of about 800 to 1000 feet per minute at a probable indicated airspeed of 115 knots until he crashed into the side of ____ mountain, approximately 200 feet from the top."

GOOD "SYSTEM" — The primary cause of the accident was the pilot's failure to execute an early waveoff during his approach from a fast starting position in preference to attempting to salvage the approach by employing an aircraft/power configuration (speed brakes extended) which he had not previously practiced.

Secondary causes of the accident were as follows:

1. Pitching deck condition instead of a relatively steady deck for carqual operations.
2. LSO not made aware of speed-brakes-extended approach configuration.
3. Delayed signal "Charlie" following clearance to break and made passes and subsequent instructions to "Delta."
4. Fuel state at "Charlie" sufficient to permit only one approach to the carrier before reaching "bingo" fuel state.
5. Strong pilot motivation to get aboard in view of two days' deck time lost to squadron due to weather.
6. Possible mirror malfunction existing at the time of the approach.
7. "Meatball" difficult to see due to sun glare.

Recommendations:

To preclude similar occurrences it is recommended that:

1. The importance of observing safe operating practices, especially during carqual, be reemphasized to all personnel concerned with the operation.
2. Whenever practical, carqual be restricted to a relatively steady deck condition.
3. The LSO be made aware of unusual aircraft configurations during carrier approaches through the aircraft spotter.
4. The port mirror (CVA-19) undergo a detailed inspection prior to next deployment to detect possible causes of suspected malfunctions in operation.
5. For purposes of accident investigations: (1) all carrier approaches be recorded on the SPN-12 record regardless of the ultimate nature of the pass, waveoff, bolter, touch-and-go, or trap landing; (2) motion picture coverage of each carrier approach be positively assured regardless of deck readiness condition.
6. A means be devised to eliminate or reduce sun reflections from the mirror.

TIME OUT — Two FJ-3s were catapulted as a combat air patrol on a VFR operational flight plan and began climbing to their assigned altitude of 35,000 feet. The CIC controller had trouble in reading the leader's transmissions and at 20,000 feet the lead was passed to the wingman. The new leader had slightly over 1000 total pilot hours with nearly 200 hours in FJs and was in his second deployment aboard a carrier.

Upon reaching 35,000 feet the CIC controller requested a fuel state to which leader reported 4300 pounds. Shortly thereafter the lead pilot was seen to remove his oxygen mask by one strap for approximately six to ten seconds. The wingman glanced at his cabin altimeter which read 14,000 feet. The leader "put his mask back on," said the wingman, "and began a forward and backward movement of his body in what appeared to be an effort to release the lock on his shoulder straps. After four or five of these motions he settled back and everything appeared normal."

About one minute later, however, the lead FJ-3 rolled over on its back and entered a near vertical dive. The wingman rolled over and followed, asking the lead pilot several times if he was in trouble. No answer was received until near the 17,000 foot mark when a short garbled transmission was heard. The wingman didn't look at his airspeed but was getting wing roll from high mach.

A high thin cloud deck hid the diving FJ-3 from sight momentarily and the wingman commenced recovering from his dive. "I recovered between 2000 and 5000 feet," he said, "pulling 8-G while observing a large splash in the water."

The board's conclusion was "pilot error" in his failing to determine, that for some unknown reason, the oxygen system was not functioning properly, resulting in a reduced state of

The squadron C.O. said: "It is difficult to understand this general disregard for required checks of the oxygen systems . . ."

consciousness. This was changed by higher command to "undetermined" as there was no outward evidence of carelessness or lackadaisical attitude, neither could it be shown that a mechanical malfunction occurred.

The real impact of the accident is what the squadron's skipper found after the accident. "Prior to this accident," he said, "I believed that this squadron was composed of exceptionally well briefed and 'oxygen conscious' pilots. Thirty minutes after this accident, I had good reason to reverse this belief." The following paragraph should explain:

"Immediately after landing aboard after the accident, I talked to the wingman of the deceased pilot. I asked him the question, 'Are you really conscious at all times of the functioning of your oxygen system?' His answer was 'No.' Not only was he not oxygen conscious, but he really didn't bother checking his oxygen regulator in the air when reporting that oxygen was normal and blinking, a required report from each pilot after joining up.

"This amazing statement was followed by the information that since he had always flown with an oxygen mask, and had never had a malfunction, he had always felt that his division leader made too many checks of the oxygen system. Further conversation with the younger pilots of this squadron disclosed that generally all the conversations about anoxia or hypoxia were regarded as just so many sea stories.

"It is difficult to understand this general disregard for required checks of oxygen systems, particularly in view of the supervised training given to each pilot from the time he enters training until, and after, he reports to a fleet squadron." (Or in view of the number of such accidents and incidents.—Ed.)

"LTJG _____ attended a lecture in the readyroom the night before he was killed. Subject: 'Care and cleaning of the oxygen mask and related dangers of hypoxia.' Quite obviously, this lecturer did not get through to the subject pilot.

"The above information is related to point up the urgent need for a more forceful program of oxygen indoctrination. Pilots of single-seated aircraft are 'on their own' while airborne and there is no means to check on their procedures. . . ."

One of the recommendations made by the accident board was for a review to be made of the present teaching methods used in some low pressure chamber checkouts, in an effort to make a more meaningful and dramatic impact in illustrating what hypoxia can mean to an aviator.

Subsequent endorsements in the chain of command noted that at present only one of a group undergoing low pressure chamber checkouts has the opportunity to remove his mask while others observe the effects of lack of oxygen. The endorsement of the Commander Naval Air Force enlarged upon this item as follows: "Consistent with chamber workloads, consideration will be given to requiring all naval aviators to unplug on the *first* fleet reindoctrination in the chamber. This procedure will have the effect of reemphasizing the seriousness of hypoxia after naval aviators have had flight experience."

OBSTACLE COURSE—Shortly before noon a HUP lifted off the flight deck of an anchored carrier and flew for several minutes in the vicinity of the ship. It then headed toward shore and a nearby city.

The helicopter was seen approaching the fleet landing area in the inner harbor at an altitude of 200 to 300 feet. Witnesses saw the helicopter fly into a heavy cable suspended from two towers in the dock area. A loud noise was heard and parts of the

Continued from preceding page

aircraft were seen falling in all directions. The HUP pitched over on its side in a nose down attitude, crashed into 30 feet of water between two jetties inside the harbor and sank immediately.

During the time the carrier was in port the pilot had made 15 flights in the local area but as far as was known this fatal flight was his first over the inner harbor area.

About a month earlier another helicopter pilot had difficulty with the cable. "I was directed to fly a HUP," he said, "from the airport to the ship which at that time was moored in the inner harbor of the port. Prior to leaving for the airport I examined the local area around the ship, taking note of such obstructions as telephone poles, buildings, wires. . . .

"In the immediate vicinity of the ship I discovered a two-inch wire cable extending from one of the hills behind the dock area down to one of the wharves near the ship. After examining the wind direction I decided that this cable would definitely be an obstruction to my landing approach.

"After takeoff from the airport . . . I proceeded to my destination. Upon arrival I commenced looking for the long cable wire I had seen previously but was unable to locate it . . . After orbiting the area for 8 to 10 minutes we finally saw the cable and effected a landing . . . My crewman and I commented on how difficult it was to see a cable of that size from the air and that the cable blended in with certain sections of the landscape."

Besides the obvious one of prior familiarization in strange territory, the accident board recommended that the Fleet turnover file include a description of all known obstructions at airfields, cities and harbors in the overseas area where helicopter operations might be expected.

The comanding officer of the helicopter squadron noted that detachments are required to forward to the parent squadron each month specific information concerning all hazards and special conditions observed by pilots while over unfamiliar territory. "This accident," he said, "has been brought to the attention of all squadron pilots with particular reemphasis on the necessity of being familiar with all known obstructions in the areas of operations . . . and of maintaining constant vigilance."

PLEASE COMPLY

IT IS a well known fact that most accidents and attendant injuries or fatalities result from noncompliance with safety rules, procedures or regulations. In this connection, a study conducted by two commercial airlines indicated that failure to follow established safety procedures was the direct cause of 90 percent of the accidental injuries received by their employees.

So what else is new?

Our problem, too, seems to be a matter of enforcing adherence to present safety rules and directives. However, more important than this is the need to foster a will to comply and a habit of following procedures established to protect each member from accidental injury or death. Full compliance with safety operational procedures would cut our annual accident losses to a bare, acceptable minimum.—*USAF TIG Brief*

Unfamiliarity and . . .

THIS reserve pilot was completing his third fam hop in an FJ. He was coming in to land, took one wave-off, and started the second approach. Traffic was heavy, which he admits tended to unnerve him. He was having difficulty trying to contact the tower because of other traffic, including a plane close behind him which was calling low state and would not go around.

Partly because of these distractions no doubt, the pilot's second approach was poor—fast, low, wrapped up. He should have taken a wave-off, did not, and landed short on the overrun with substantial (C) damage, no injury.

Pilot believes if there had been no traffic and if he had been able to make a normal approach and landing there would have been no accident; therefore, he suggests that all fam hops be commenced at a time which would insure returning to the field when traffic will be at a minimum.

He further recommends that once the transition to swept-wing aircraft has been made, no flights be made in the straight-wing jets until the fam stage has been completed. He feels he'd have made the runway easily in the TV-2 which he flew the two previous days.

The F.S. adds that it would be well to have more bounce time early in the syllabus at some outlying field with less traffic.

WHIZ QUIZ

True or False:

1. Life jackets are inspected and tested every month ____
2. The chest buckle should be unfastened first in getting out of a chute harness. ____
3. Shark chaser and dye marker should not be used together. ____
4. The final number in a life raft designation tells how many occupants it is intended for. ____
5. The pararaft lanyard was designed for securing the raft to the wearer and as a guide in locating the CO_2 bottle. ____
6. Deflation of the CO_2 compartments of a life vest is normally accomplished by:
   a. Depressing the oral inflation valve ____
   b. Puncturing the vest ____
   c. Removing the CO_2 caps ____
   d. All of the above ____
7. A broken safety tie on a parachute should be immediately
   a. Disregarded ____
   b. Retied by the plane captain ____
   c. Retied by wearer ____
   d. Called to the attention of rigger ____
8. The life raft should be boarded from:
   a. Either side ____
   b. Forward or large end ____
   c. The side the CO_2 bottle is attached to ____
   d. The stern or small end ____
   e. Either end ____

See Answers page 48.

Wheels-Up Saves

BOX SCORE

May 1957	2
May 1958	2

NAME	STATION	AIRCRAFT	DATE
WARMBOE, L. A. Jr., AC3 ALBINGER, J. J., AN	NAAS CABANISS	AD	4/8/58
JUDD, R. K., ACC * MURRAY, F. W., AC2 *	NAS ROTA	P2V-5	4/10/58
BURNS, R. A., AC2 O'DELL, H. M., AC1 VANNESS, T. E., AC1	NAS Oceana AD		4/21/58
BABB, K. E., AC2	NAS Oceana AD		4/21/58
KEARNEY, W. J., AC2 NASH, R. A., AN GREENE, C. D., AN	NAS Oceana F9F		4/22/58
BENJAMIN, W. A., AN	NAAS Chase	F9F-8	4/21/58
NOWAKOWSKI, A., AN	NAAS Chase	F9F-8	4/30/58
WHITE, R. E., PM3	NAS Miramar	F9F-8	4/23/58
HARRIS, J. E., ATR3	NAS Miramar	F3H-2M	4/23/58
PFC D. B. TUCKER, USMC	MABS-14	A4D-2	5/15/58
CPL W. W. GERLOFF, USMC	MABS-27	F9F-8	5/ 9/58
MERRILL, R. W., ACT3 KILLBORN, L. J., HSAA	NAAS Kingsville	S2F	
RANDALL, R. N., AC1	NAAS Kingsville	TV-2	

SEA WATER: SURVIVAL OR SUICIDE

By
Wm. H. Allen
and
Alonzo M. Pond
Research Studies Institute
Air University

Reprinted from COMBAT CREW, magazine of the Strategic Air Command, USAF.

RECENTLY several magazines and newspapers have carried articles which present so-called "proof" that men have sustained life at sea in simulated survival conditions by drinking the sea water that is all about them. Many of the articles hail these experiments as freeing man from the terrors of dying of thirst at sea.

The average aircrewman, reading these reports and knowing that he may someday be sitting in a liferaft with very little fresh water, wants to know if this information is true and, if so, why the Air Force doesn't change its present survival teachings and show survivors how to use sea water to quench thirst. This is a good question, and there is a good answer.

Air Force survival instructions warn men against drinking sea water because, (1) Actual survival experience has shown that men who drink no water at all live longer than men who drink sea water, and (2) On the basis of present physiological knowledge, sea water should be regarded as a poison and should not be drunk in any quantity, in any form, or at any time.

Salt water is harmful in three ways: As an emetic it causes loss of body water through vomiting; as a cathartic it causes loss of body water through diarrhea; its high salt content forces the body to use up fluids to eliminate the excess minerals. Therefore, if you drink sea water you will lose precious body water rather than gain it.

Test Not Valid

Most of the recent publicity stems from experiments by French scientists following up the work of Dr. Alain Bombard, who drifted across the North Atlantic from the Canary Islands to Barbados in 1952 on a rubber liferaft. Bombard claims to have drunk sea water for several days when no fresh water was available. He did not die from drinking the sea water; therefore he assumed that he benefited from it. Dr. Bombard survived in spite of his theory, not because of it.

In closely monitored experiments other French scientists tested Bombard's methods. They determined that if a man drinks 500 cc. (just over a pint) of sea water a day in doses of 50 cc. (a rather large jigger) at a time, drinks no more than 10 times in 24 hours with at least an hour between drinks, this man can go without fresh water for five days. However, on the 6th day he must drink at least a quart of fresh water to eliminate excess salt from his system or he will surely die.

The experimenters do not claim that sea water will keep a man alive indefinitely. They claim only that a man can alleviate his thirst by drinking small quantities of sea water, and that if he drinks it in these small amounts he will not die for at least six days.

You Bet Your Life

The experimenters emphasize that sea water drinking should begin at once, before the victim gets dehydrated. They point out that drinking sea water by a man already dehydrated is dangerous, for it speeds up the water loss of cells unable to stand such plundering.

In other words, if you want to try those ocean cocktails at your next sea survival party, be sure you are not dehydrated when you start. So don't get seasick at the start of your raft experience. Sweating is another way to speed dehydration. The experimenters were very careful not to complicate their tests with this bit of survival realism. They kept their subjects in temperatures around 65° F. Be sure you have your ditching in a mild climate if you plan to duplicate the experiments.

Suppose that two men are sitting on small rafts on a large ocean. One decides to drink sea water according to the large-jigger-ten-times-a-day theory, the other decides to tough it out and wait for rain. What will happen?

First, the man who decides to drink sea water has gained the certainty that he will die on the 6th day unless he can drink enough fresh water before then to eliminate the accumulated poison.

Second, he has made three separate bets:

1. He has bet his life that he can estimate each sea water drink accurately to a dose of 50 cc., can limit his drinking to one dose every 60 to 90 minutes, and not exceed 10 doses per 24 hours or take in any additional sea water accidentally. (This is not easy. World War II records show that most men do not have the will power to drink only a small quantity of sea water. And large quantities mean a quick death.)

2. He has bet his life that he can control his drinking within those limits for six days regardless of heat, cold, or turbulent seas under survival (not laboratory) conditions.

3. He has bet his life that it

Continued from preceding page

will rain or that he will be rescued on or before the sixth day.

Third, he has increased his chances of getting seasick and getting diarrhea.

Fourth, if all goes well he hasn't been very thirsty. The experimenters claim that is because the sea water doses prevented thirst. They forget to mention that in air temperatures of 65° (under which the experiments were conducted) normal body temperatures are maintained without sweating, and thirst should not be great. Even so, the salt water drinkers did get thirsty on the fourth day.

It is important to remember that thirst is only a signal that the body needs water. Just because you have turned off the signal does not mean you have put out the fire. People do not die of thirst. They do die of dehydration, which is simply lack of body water. There are many ways to stop the sensation of thirst, but only drinking fresh water will stop dehydration.

What about the second man who is using no water at all? The table on this page shows his expected survival time at different environmental temperatures. This table, prepared by Dr. E. F. Adolf during World War II, has been verified by the records of actual survivors. If the man uses the raft cover to protect himself from the direct rays of the sun, he will survive at least seven days in the hottest temperatures ever found on the surface of the sea. At lower temperatures his expected survival time is 10 days. In World War II the maximum time without water recorded by any survivor was 11 days, just one day longer than the prediction and five days longer than a salt water drinker would have lasted.

To sum up, the man who drinks sea water has bartered one or more days of survival time for two or three days' freedom from the sensation of thirst. The man who drinks no water has experienced the pangs of thirst a day or so longer, but is free from the poisonous effects of sea water and can expect from one to five days more survival time.

HOW LONG CAN A MAN SURVIVE IN THE SHADE

Max Daily Shade Temp	No Water	With 1 Qt.	With 2 Qts.	With 4 Qts.	With 10 Qts.	With 20 Qts.
	Days of Expected Survival					
90°	7	8	9	10.5	15	23
80°	9	10	11	13	19	29
70°	10	11	12	14	20.5	32
60°	10	11	12	14	21	32
50°	10	11	12	14.5	21	32

We all know that scientists have done wonderful things with the human body. There are test tube babies and transplanted kidneys. Unless you have a kidney transplanted from a camel or from a desert kangaroo rat, your kidneys cannot concentrate urine to more than two percent salt content. They will not remove the salt of 3.5 percent sea water from your body without more water than the drink provides.

If your kidneys are working at top efficiency, and you take in no salt in your food, you will gain about 100 cc. of fresh water each day you have before salt accumulation kills you, you actually gain less than one-half of one day's water requirements.

If you ever are in the unfortunate position of looking at the great rolling sea from the deck of a liferaft, do not drink sea water. Get ready to catch rain water when it comes. If you have a solar still packed with the raft, use the still during Daylight hours, use desalting kits when other water sources fail. Protect yourself from the direct rays of the sun. Get all your signals in working order and use them at the first opportunity. Your chances of survival will be much better than those of the man who drinks sea water by the jigger and far greater than the man who drinks it wantonly.—

What's a little salt, we'll be picked up in a couple of days. . .

ABOUT THE AUTHORS:

William H. Allen, executive officer of the Arctic, Desert, Tropic Information Center at the Air University, has been working on Air Force survival problems since 1943. During World War II he was with the First Arctic Search and Rescue Squadron in Greenland, and has been a consultant to SAC for survival training since 1949.

Alonzo W. Pond, chief of the Desert Branch, ADTIC, is the author of many popular and scientific books and articles on survival. He served as archeologist with the Roy Chapman Andrews expedition in the Gobi desert and has been project officer on survival tests in the Sahara and Libyan deserts.

NOTES FROM YOUR *Flight Surgeon*

'Copter Rescue Seat

Dispatch traffic indicates that Det One of HU-2 has had an opportunity to use the new helicopter rescue seat, and that it performed "as advertised." A man was blown off the deck by jet blast, into 46°F water. Rescue pilot said he was intermittently under water and appeared completely exhausted, that he likely wouldn't have been able to get into a sling and quite likely wouldn't have survived long enough for a crewman to be sent down for an immobile rescue. The man grasped the flotation tank and kneeled on the seat prongs, and was promptly hoisted aboard. He later said that he didn't remember the 'copter being overhead or what means were used to rescue him.

Darkness Spoilers

"All pilots in the launch were dark-adapted at least one hour prior to the flight, but all were exposed to a bright white light at the foot of the escalator . . ."

Prior to permitting pilots to leave the readyroom for night and pre-dawn launches a non-flying squadron representative should check the passageways to the flight deck for white lights and turn them OFF if they have been left ON.

Ants in Mae Wests

UtRon 10, while based ashore at Gitmo Bay, Cuba, discovered holes in both outer air compartments of 30 percent of their mae wests (as many as 20 holes in a vest). These holes were generally uniform in size, about the diameter of a pin head. Small red ants were found inside the damaged vests; hence they are suspected of causing the damage.

As a preventive measure, UtRon 10 now hangs the life vests on a steel rack with the four legs of the rack set in cans of diesel oil.

Weekend Warriors

Weekend warriors should allow plenty of time for travel between the last cup of coffee in the kitchen at home and the first one at NAS.

This was brought to my attention again recently by an accident report on a mid-air collision between a T34B and a civilian plane. Investigation showed that it had been the pilot's habit to leave for drill weekends early Saturday morning. He got up at 4 A.M., then drove for 2½ hours to reach the airfield. He usually stopped somewhere along the way for breakfast. Whether this situation contributed to the accident in question can never be proved but the danger of flying after a fatiguing automobile trip is obvious. This practice is followed by many men coming to weekend drill from distant places. They arrive tired before their day on the station begins.

Weekend warriors should be encouraged to come to their duty stations the night before they are to fly, spend the night quietly in the BOQ and follow it with a good unhurried breakfast.

On the Cuff

On landing rollout the F9F-8B pilot reached forward with his left hand to actuate the canopy control lever (open canopy provides aerodynamic drag). The left sleeve of his flight suit engaged the throttle and moved it full forward. The aircraft began to accelerate. By the time the pilot determined the cause of the acceleration and reduced throttle the end of the runway was rapidly approaching. Heavy braking resulted in heated brake drums and blown tires.

This incident was caused by the inadvertent engagement of the throttle by a loose left cuff on a flight suit.

The flight suit worn by this pilot did have straps to secure the cuffs. However, the straps were not fastened.

It is recommended that all flight suits be equipped with straps at the cuffs and that these straps be fastened at any time a pilot is in an aircraft. See ACSEB 9–56

Hearsay

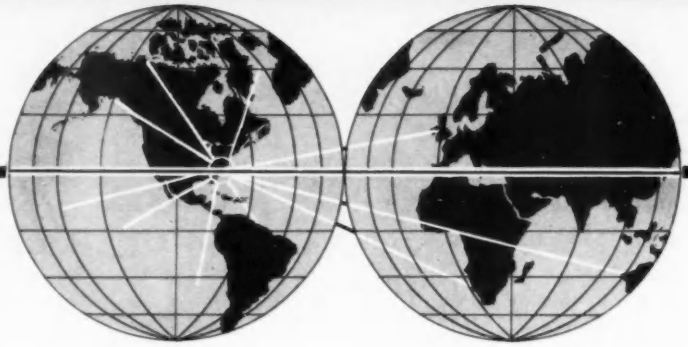
NOISE "doesn't bother" you? You "get used to it?"

Beware! Maybe you "*get used to it*" because your hearing ability is damaged!

Extreme temporary loss of hearing ability can occur without permanent harm, if sufficient time for recovery is allowed before the next exposure. But prolonged exposure, repeated exposure, will eventually mean a certain amount of permanent deafness.

Play it safe and wear ear plugs.

MONITOR



Reading Altimeters

. . . . . aircraft hit a hill when he was supposed to be holding at 16,000 feet. With a possibility of the pilot misreading the altimeter, the flight was duplicated at 6000 feet. The pilot duplicating the reported holding patterns claims that he would have hit the hill 30 feet away from the crash site if he had not pulled up. The moral of the story of course is to know how to read the altimeter. It has happened many times before and it will happen again. Will you be the next one?—*2d MAW*

Adopts Breaking Point

From the March issue of the APPROACH magazine: "Takeoff traffic make an immediate right turn of about 30 degrees when lefthand traffic is in use. This would have to take into consideration such things as populated areas, of course; and a runway with righthand approach would require a left turn after takeoff." The council discussed and agreed to adopt the procedure of a 30-degree or slight jog as a standard policy at Whidbey Island.—*Whidbey Area Safety Council.*

Transport Seats

Reference was made to a recent transport aircraft accident. The aircraft concerned had both the old type and the new strap down seats incorporated. The results of the accident indicated that the old type seats broke loose from their mounts, resulting in fatal injury to persons occupying them. The new (strapdown) type remained secure and their occupants received no injuries. It was recommended that all transport squadrons inspect their aircraft to determine whether or not any of their aircraft contain the old type seats and to take appropriate measures for their replacement with the new (strapdown) type seat.—*Chesapeake Area*

P5M Firefighting Equipment

Use of ramp firefighting equipment for turning up P5M aircraft on the ramp: The ramp CO_2 fire extinguisher, however impractical, should be utilized until a better means of combatting engine fires is made available. It was proposed that a foam truck be made available by the fire station to standby in the ramp area at a convenient point to be readily accessible to aircraft in need. It was pointed out that such a fire truck is the only equipment capable of fighting P5M engine fires and fires in the nacelle area. Hand fire extinguishers have only limited application, especially when the engine is turning up.—*Chesapeake Area Aviation Safety Council.*

EXCERPTS FROM SOME OF THE NAVY'S SAFETY COUNCILS THROUGHOUT THE WORLD, WHO PROVIDE LOCAL LEADERSHIP AND EMPHASIS TO THE NAVAL AVIATION SAFETY PROGRAM.

Second-Hand Dope

Station Operations has been receiving 60 to 70 phone calls a week for information concerning air fields in the United States. Most of this information requested (i.e. runway lengths, type fuel, JASU, etc.) may be found in the Radio Facility Charts. Probably some of the requests are the result of second-hand information received from pilots who have been on a cross-country and reported that a certain field has a facility that is not listed in the Radfac. Remember, "it is also the responsibility of any person noting an error (or omission) in a facility listing to *report* it for correction." (page 2, par. 5. of any Radfac).—*Aviation Safety Board 2d MAG*

Towing Aircraft

The problem of expeditiously removing aircraft from the runway after an emergency landing. In addition to the slings and crane presently used, a dolly is being constructed which can be placed under a damaged wheel, so that the aircraft may be towed off the runway. Joint crash crew and squadron personnel drills were recommended to improve technique in hoisting aircraft using the MB-1 crane and slings excluding the actual hoisting of the aircraft.—*Whidbey Area*

Accentuate the Positive

To prevent accidents and insure success in flying we must:

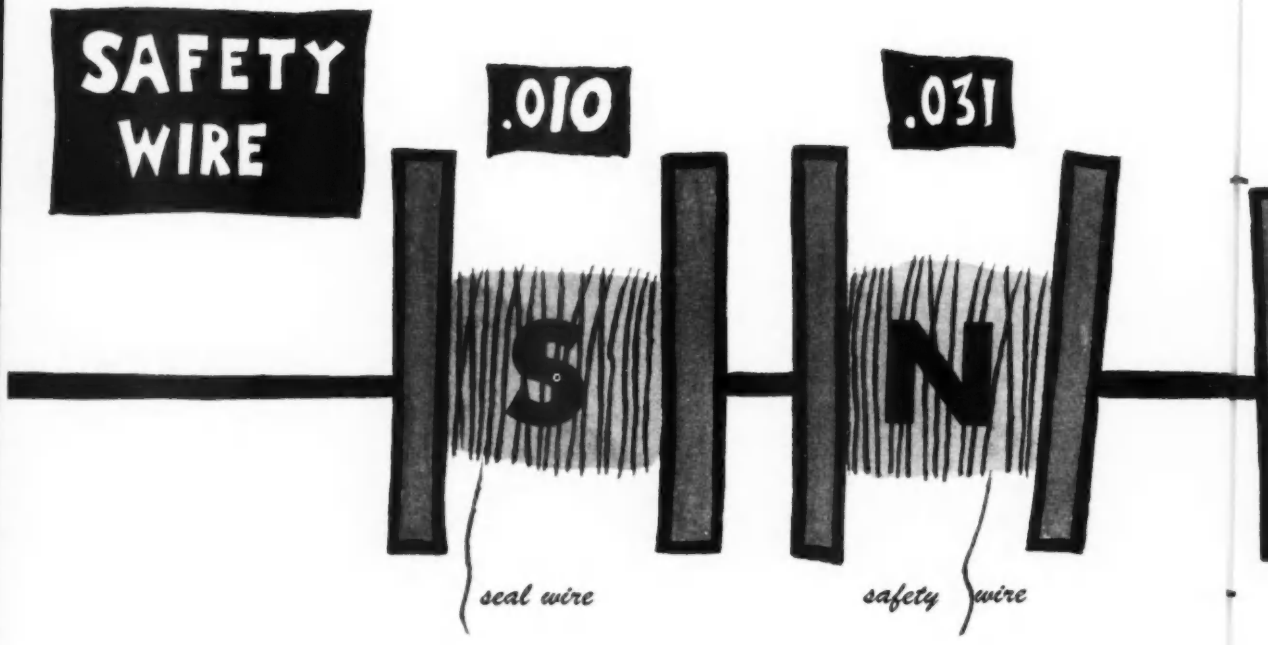
(1) Select pilots with the capability to carry out a complex mental task in a hazardous occupation, and eliminate those with impaired capability.

(2) Train pilots to make adequate responses to situations, encourage pilots to become true students of their professions, and insure maintenance of proficiency by continuous performance of the pilot in his specialty as a trained specialist.

(3) Eliminate or compensate for environmental hazards inside and outside the aircraft which compromise pilot efficiency.—*NAS Atlantic City Sub-Area.*

". . . A Mid-air Collision Can Ruin Your Whole Day . . ."

While not quite mathematically correct, it does appear that vigilance is inversely proportional to visibility. As the visibility gets better there is a tendency to think, ". . . they can see us for miles . . ."; but what if *they* are thinking the same way? Summer flying weather, longer daylight hours, and vacations mean more private aircraft sharing the air, heavier airline schedules, more tactics and training flights . . . and more vigilance!—*Weekly Summary.*



Sometimes we in naval aviation feel that anything as simple as the process of safety-wiring needs no particular attention. The number of accidents and

Why did it take years for the auto industry to remove the whip socket from the dashboard of the gas buggy?

incidents resulting from improper safety-wiring indicates the opposite is true. Hence, this round-up of safety-wire specifications and related information.

You can probably think of a number of reasons, but one appears to be most likely—the auto industry then, like the aviation industry today, was so busy thinking in terms of tomorow's developments that it overlooked many of those of yesterday.

This analogy can possibly explain an oversight of the kind mentioned by the writer in Headmouse on page 23, who cites a case where a P2V Illustrated Parts Catalog calls for .040 copper wire to secure J-hooks of the landing gear and such a wire isn't even in the aviation supply system. Further, the book calls it safety-wire when in fact it is "shear wire" — albeit Military Standard Specifications (MS33540) permits a choice in the use of terms. The misnomer "safety-wire," which now means either or any of the following, "seal-wire," "lock-wire," "shear-wire," and among these, "safety-wire," appears to be one of the principal reasons for the SNAFU in safety-wiring.

"Safety-wire" according to Baughman's Aviation Dictionary and Reference Guide, 3rd Edition 1951 is: "a flexible brass or copper wire used to prevent turning of nuts, bolts and turnbuckle barrels." Since 1951 the materials for safety-wiring were changed in most cases to stainless steel, but the purposes for which safety wire is used are still valid.

Why not call safety-wire, "safety-wire" only when it's used as safety-wire?

Another reason for the SNAFU is the fact that we have been using less-than-best practices in applying and identifying seals. It's about time we took a cue from the fire protection industry which has long ago adopted a seal universally accepted for its particular function. The applications for seal wire and shear wire are treated later in this article.

approach

Continued from preceding page

To illustrate some of the "unsafe" aspects of using "safety-wire" in place of seal wire, here is a brief quote from a recent dispatch: "Safety-of-Flight . . . F9F-8B . . . Upon delivery pilot discovered emergency igniter handle safety-wired with stainless steel wire. . ."

From a recent BuAer speedletter:

". . . the mechanic was unaware of the safetywire's purpose and unwittingly used whatever piece of wire was available at the time..."

"Stainless steel wire was inadvertently used in test operations to safety the green apple disc in the emergency oxygen supply to of the Douglas seat pan assembly. The test indicated that the use of incorrect safety-wire [in lieu of seal wire] will prevent activation of the emergency oxygen. With the miniature oxygen regulator, this becomes a potential pilot suffocation problem.

"All F8U and A4D squadrons are advised to inspect for this hazard. The correct type wire to be used is .010 soft copper wire, stock number GX6145-234-4991. (*This item also, is* not *in the aviation supply system—Ed.*)

"The next revision of the F8U and A4D H.M.I. will reflect the correct safety wire and other seat pan assembly information."

It takes very little aviation background for one to imagine the consequences in cases like this which are undetected. Is there any logical reason for not calling a seal wire or shear wire by its right name? The evidence indicates there isn't —so, let's learn to call 'em as we see 'em, we're more apt to use 'em right. Too, people tend to follow the guy who knows where's he's going—maybe, the rest of the "industry" will follow suit.

From Military Standards MS33540, Rev. A 27 April 1954, Rev. B, 1 April 1955:

MATERIALS:

The materials for safety-wire shall be those materials listed in Air Force-Navy Aeronautical Standard Drawing AN995 (now superseded by MS20995 of 3 Jan 1957).

GENERAL INSTRUCTIONS FOR THE SELECTION AND APPLICATION OF SAFETY-WIRE:

The temperature and atmosphere limitations are:

Ambient Temperature	*Atmosphere*	
	Corrosive	*Normal*
Up to 450°F	Corrosion Resistant Steel Monel Inconel	Carbon Steel, zinc coated Corrosion Resistant Steel Monel Inconel
Up to 800°F	Corrosion Resistant Steel Monel Inconel	Corrosion Resistant Steel Monel Inconel
Up to 1500°F	Inconel	Inconel

The service limitations are:

Non-Magnetic Requirements	*Emergency Devices*	*Safety-Wire Conducting Magnesium*
Corrosion Resistant Steel Monel Inconel	Copper (.020 only)* Aluminum (.031 only)	B. Alclad 5056 (CLAD 56S) Aluminum alloy wire

A pigtail of ¼ to ½ inch (3 to 6 twists) shall be made at the end of the wiring. This pigtail shall be bent back or under to prevent it from becoming a snag.

Safety-wire shall be new upon each application.

When castellated nuts are to be secured with safety-wire, tighten the nut to the low side of the selected torque range, unless otherwise specified, and if necessary, continue tightening until a slot alines with the hole.

In blind tapped hole applications of bolts or castellated nuts on studs, the safety-wiring shall be in accordance with the following general instructions:

Hollow head bolts are safetied in the manner prescribed for regular bolts.

Drain plugs and cocks may be safetied to a bolt, nut, or other part having a free safety hole in accordance with the general instructions contained herein.

External snap rings may be safetied if necessary in accordance with the general safetying principles contained herein. Internal snap rings shall not be safety-wired.

Electrical plugs which require safetying and/or which employ screws or coupling rings to fasten the individual parts of the plug together as one unit shall be safety-wired in accordance with the safetying principles outlined here unless otherwise specified.

Larger assemblies such as hydraulic cylinder heads, super-chargers, clutch mechanisms, etc., for which safety-wiring is required, but not specified, shall be safety-wired in accordance with the principles outlined here.

Drilled head bolts and screws need not be safety-wired if installed into self-locking nuts in accordance with AND10068 or installed with lock washers in accordance with AND10476. Castellated nuts with cotter pins or safety-wire are preferred on bolts or studs with drilled shanks but self-

locking nuts are permissible within the limitations of AND10068.

From Engineering Handbook on Aircraft Structural Hardware, TO 1-1A-8, of 3 July 1947, Rev. 1 Feb 1956:

SAFETY-WIRING — Parts, such as drilled-head bolts, fillister-head screws, turnbuckles, thumbscrews, plugs and similar items are safetied with wire, zinc coated, soft steel, Specification QQ-W-461, Rev. B. Annealed corrosion-resisting wire, Specification QQ-W-423, condition A, is also used for specific situations, such as where non-magnetic qualities and heat resisting properties are desired.

The double-twist method is the most common method of safety-wiring and should substantially be as shown in figure 1. The twisting may be accomplished by hand* with the exception of the final few twists which should be accomplished with pliers in order to apply tension and secure the ends of the wire properly. The safety-wire should always be installed and twisted so that the loop around the head stays down and does not tend to come up over the bolt head, causing a slack loop. This does not necessarily apply to castellated nuts when the slot is close to the top of the nut. The wire will be more secure if it is made to pass along the side of the stud. Safety-wire must never be overstressed. *Extreme care must be used when twisting the wires together to insure that they are right but not over-stressed to the point where breakage will occur under slight load or vibration.*

The single-twist method of safety-wiring may be used on small screws in a closely spaced, closed geometrical pattern (triangle, square, rectangle, circle, . . .), parts in electrical systems, and in places that are difficult to reach that would make the single-wire method more advisable. Fig. 2 illustrates a typical application where the single wire method may be used.

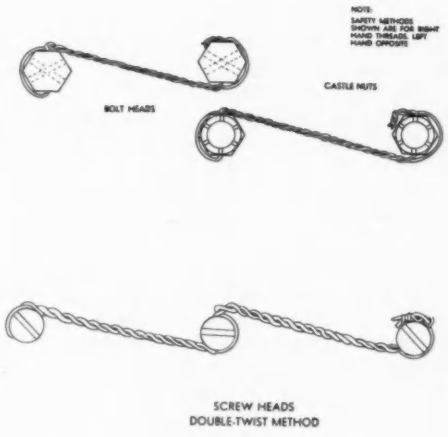
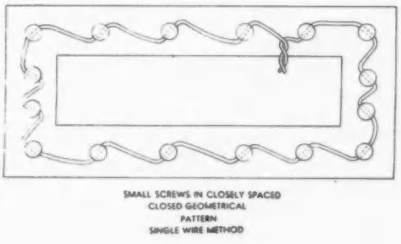


Fig. 1



". . . If a Technical Order, or Drawing calls out a particular size of wire, and that size is not available, it is best to go the next larger size of comparable material. By observing this general recommendation, the use of a lockwire which is too small to function properly is avoided . . ."

Fig. 2

a. When using the double-twist method of safetying, 0.032-inch minimum diameter wire shall be used except on small parts which have a nominal hole diameter of less than 0.045-inch. Safety-wire of 0.020-inch diameter may be used as applicable in holes having a nominal diameter of less than 0.045-inch. When using the single-wire method, the largest nominal size wire which the hole will accommodate shall be used.

*Safety-wire failures due to wire being twisted too tight—"First safety-wire turn must be made by hand if at all possible and no more than six turns per inch for the remainder distance with equal looseness for finish twists."—BuAer Disp. 131733Z, Aug. '57.

Continued next page

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"the aircraft and its components must be protected against the effects of normally inadvertent or uncontrollable human errors or carelessness..."

An oil cap properly safety-wired is shown in fig. 3. In this installation the wire is anchored to an adjacent fillister-head screw. This same method is applied to wing nuts, filler plugs, single drilled-head bolts, fillister-head screws, and the like, which are to be safety-wired individually. Ordinarily, anchorage lips are conveniently located near these individual parts. When such provision is not made, the safety-wire is fastened to some adjacent part of the assembly.,

Finished ends of safety-wire shall be bent back or under to prevent injury to hands or personnel.

When drilled-head bolts, screws, or other parts are grouped together they are more conveniently

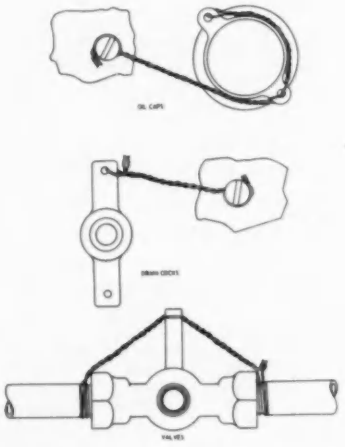


Fig. 3

Safety methods shown are for right-hand threads. Left-hand, opposite.

safety-wired to each other or in series rather than individually. The number of bolts, screws, nuts . . . that may be safety-wired together is dependent upon the application. For instance, when safety-wiring widely spaced bolts by the double-twist method, a group of *three* shall be the maximum number in a series.

When safety-wiring closely spaced bolts, the number that can be safety-wired by a 24-inch length of wire shall be the maximum number in a series. The wire is arranged in such manner that if either a bolt, screw, or a threaded item begins to loosen, it will have force applied in the tightening direction. Parts being safety-wired should be torqued to recommended values and holes aligned before attempting to proceed with the safetying operation. *Never over-torque or loosen a torqued nut to align safety-wire holes.*

SAFETYING TURNBUCKLES—Several different methods of safety-wiring turnbuckles are in use; however a standard procedure has been adopted by the services as the preferred type. This preferred method is shown in fig. 3A and should be used in preference to the method shown in fig. 3B.

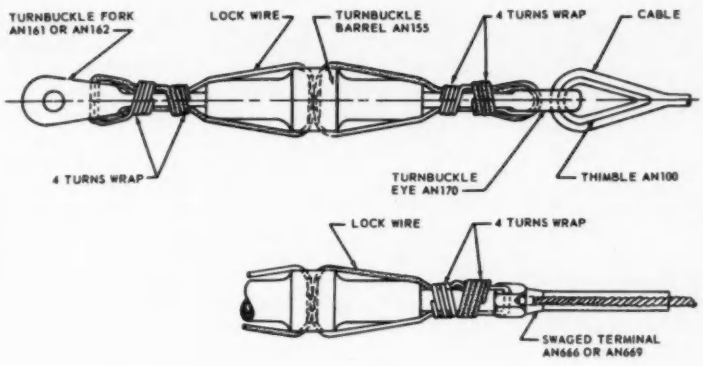
However, turnbuckles safety-wired in accordance with fig. 3B may be continued in service until such times as safety-wire replacement is required. When replacement is required the method shown in fig. 3A should be used.

Prior to safetying, both threaded terminals should be screwed an equal distance into the turnbuckle barrel and shall be screwed in at least so far that not more than three threads of any terminal are exposed outside the barrel. After the turnbuckle has been adjusted to its locking position, two safety-wires shall be passed through the hole in the center of the turnbuckle barrel, and the ends of the wires shall be bent 90 degrees towards the ends of turnbuckle barrel as shown in fig. 3A.

The ends of the wires shall be passed through the hole in the turnbuckle eyes or between the jaws of the turnbuckle fork as applicable. The wires shall then be bent toward the center of the turnbuckle and each wrapped *four* times around the shank, binding the wrapping wires in place, as shown in fig. 3A. When a swaged terminal is being safetied, one wire shall be passed through the hole provided for this purpose in the terminal looped over the free end of the other wire and both ends shall be wrapped around the shank as shown in fig. 3A.

Wire, zinc coated, soft steel, Specification No. AN-W-22 [superseded by QQ-W-461, Rev. B.] is the standard turnbuckle safety-wire. Annealed corrosion-resisting wire, Specification No. AN-W-23 [superseded by QQ-W-423] is used only in non-magnetic areas or where heat resisting qualities are desired. Use .032 wire on turnbuckle assemblies where the cable diameter is $\frac{1}{16}$-inch, .041 wire on assemblies using cables of $\frac{3}{32}$- and $\frac{1}{8}$-inch diameter, and .047 wire on assemblies where the cable diameter is greater than $\frac{1}{8}$-inch.

On maintenance of aircraft where the present standard sizes have not been installed, no change



Below, safety-wire to be composed of one length of wire wrapped as shown. Since the wire is wrapped in both right-hand and left-hand direction, the right-hand and left-hand thread of the barrel and terminals may be ignored. Either end may serve as the start or finish of the wire. Cross the free ends of wire before final wrapping.

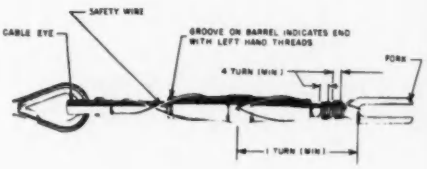


Fig. 3A. Safetying Turnbuckles (Preferred Method)

is required to comply with the current policy as reflected in the AN669 swaged terminal and this paragraph, on turnbuckles already installed.

On replacement installations, terminals with hole sizes sufficient to accommodate wire sizes specified above, will be safety-wired with those sizes. Where hole sizes are not sufficient to accommodate .041 wire on 3/32- and 1/8-inch turnbuckles, and .047 wire on turnbuckles above 1/8-inch, the use of .032 wire on 3/32- and 1/8-inch turnbuckles, and .041 wire on turnbuckles above 1/8-inch is authorized. Care should be exercised in the safetying operation, particularly where corrosion will present a problem. Past experience has shown that the smaller wire sizes tend to crack when sharp bends of the wire are encountered during installation.

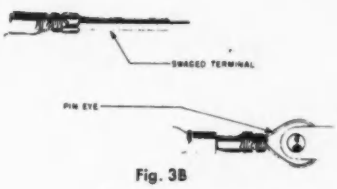


Fig. 3B

From Aeronautical Technical Inspection Manual, NavAer 00-15PH-500, Aircraft Components.

INSPECTION—All safetywire must be tight after installation but not under such tension that normal handling or vibration will break the wire. Watch carefully to see that bolts are not backed off to obtain the necessary tightness in the safetywires.

The following requirements are in general use of safety wires:

►The wire must be applied so that all pull exerted by the wire tends to tighten the nut.

►Twists should be tight and even, and the wire between nuts as taut as is possible without overtwisting.

►The surface of plated or coated safety wires should not be cracked or peeled as a result of twisting. The wire should not be cut, kinked or nicked.

►Final anchorage should be accomplished by twisting the ends of the wire together.

Lockwiring the PRT Hood Clamp of P5M

Investigation of several reports of PRT hood clamps becoming loose in flight has resulted in an engineering reviewal of the present method of safety-wiring the clamp. It has been determined that .063, QQ-W-423, annealed safety-wire should be used in lieu of .035 and .041 wire.

This wire should be fastened around the bolt at the base of the head and bolt housing instead of being attached to the sheet metal strap that supports the head end of the bolt housing.

The reason for this change is that the square edge of the strap tends to nick the wire and the relative motions between the bolt head and strap can then shear it. This change is the recommended method of lockwiring the P5M turbine hood clamp bolt.—Martin Service News.

Continued from preceding page

Copper wire and aluminum wire are used wherever structural equipment or safety of flight emergency devices require shear wire or identified in specific technical orders to secure equipment while not in use.

From Engineering Handbook on Aircraft Structural Hardware, TO 1-1A-8, of 3 July 1947, Rev. 1 Feb 1956:

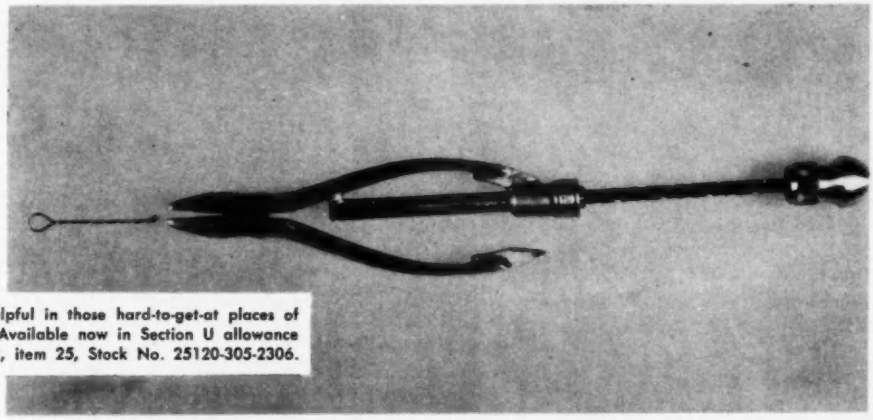
SEALS, SHEAR, WIRE—Copper wire (0.020-inch diameter) or aluminum wire (0.031-inch diameter) or other similar wire called for in specific technical orders may be used as *seals* on equipment or non-structural components such as *first aid kits, small portable fire extinguishers, emergency valves or oxygen regulators* . . . to indicate whether these items have been tampered with or have been used.

On new design aircraft, shear-wire is not used to secure nor is it dependent upon fracture as the basis for operation of emergency devices such as handles, switches, guards covering handles, . . . that operate emergency mechanisms such as emergency exits, fire extinguishers, ejection seats, emergency cabin pressure releases, emergency bomb releases, emergency landing gear door releases and similar items. (On the basis of this and the precept that "an aircraft and its components must be protected against the effects of normally inadvertent or uncontrollable human errors or carelessness," in the future you may expect in place of shear-wire, a spring-loaded latch which could be operated only by a strong jerk—Ed.)

Where existing structural equipment or safety of flight emergency devices require safety (*or shear*) wire (in accordance with specific technical orders to secure equipment while not in use), but which are dependent upon shearing or breaking of the wire for successful emergency operation of equipment, *particular care shall be exercised to assure that safetying under these circumstances shall not prevent emergency operation of the devices.* Copper wire, 0.021-inch diameter, and aluminum wire, 0.031-inch diameter, shall be used on such applications. (Please see Headmouse, page 23 re .040 copper wire—Ed.)

". . . in newer model aircraft emergency exits can be opened by a strong jerk."

EMERGENCY ESCAPE HATCHES—*Several dispatches were sent recently between units concerning safety-wire on emergency escape hatches —one unit transferred a helicopter to another unit and it was discovered that the emergency escape windows were secured with steel wire. Emergency escape hatches should be secured with a wire that can be broken easily. Copper and aluminum are used, depending upon the specifications required by that particular craft at that particular location. Check "Truth and Consequences" (Oct 1957* APPROACH*) to see what happens when the proper wire is not used. There are also several letters to the editor on the same subject. See page 3 and the Feb 1958 issue of* APPROACH.—*Ed.*



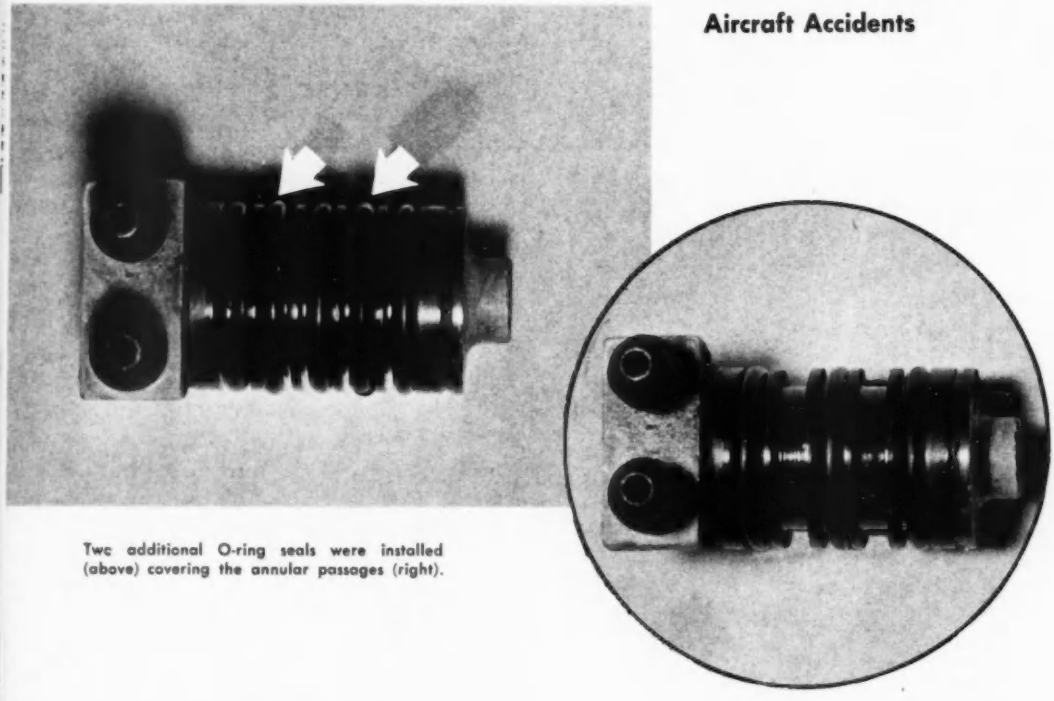
Wire Twisting Pliers are helpful in those hard-to-get-at places of your engine or airframe. Available now in Section U allowance lists of July 1957, page 41, item 25, Stock No. 25120-305-2306.

Cross reference list of Aviation Supply Office stock numbers and Federal stock numbers of shear, seal, safety and lock wire sizes commonly used in naval aviation (1-lb. spools).

Nominal Diameter	ASO Stock No.	Federal Stock No.
	COPPER, SPEC. QQ-W-341 ANNEALED	
.010	None	G6145-234-4991-G327
.020	RF9505-603-416	G6145-236-9503-G327
.040	None	G6145-236-9491-G327
	ALUMINUM, SPEC. QQ-A-411 TEMPER 0	
.031	R22AN 995 A-31M1	R9525-596-3347-G327
.047	R22W 73-50	R9525-288-5986-G327
	NICKEL-COPPER ALLOY (MONEL) SPEC. QQ-N-281-81 CLASS "A", COLD DRAWN, ANNEALED	
.020	R22 AN-995-NC20M1	RF9505-603-4116-G327
.032	None	RF9505-603-4118-G327
.040	None	RS9525-603-8384-G327
.045	None	RN9525-529-7533-G327
.051	None	RN9525-603-4141-G327
.091	None	RN9525-603-8381-G327
	CORROSION RESISTANT STEEL, SPEC. QQ-W-423, COND. A.	
.010	R22W-2999	R9505-221-2656-G327
.013	R22W-3000	R9505-223-8784-G327
.020	R22AN-995-C20M1	R9505-603-4116-G327
.030	R22W-3007	R9505-221-2637-G327
.032	R22AN-995-C32M1	RF9505-603-4118-G327
.034	R22W-3010	R9505-221-26531-G327
.036	R22W-3011	R9505-221-2654-G327
.040	R22W-3015	R9505-221-2661-G327
.041	R22AN-995C41M1	RF9505-603-4120-G327
.047	R22AN-995-C47M1	RS9505-603-4132-G327
.051	R22W-3020	R9505-221-2662-G327
.054	R22W-3022	R9505-221-2664-G327
.062	R22W-3025	R9505-221-2665-G327
	CARBON STEEL. ZINC COATED SPEC. QQ-W-461B1	
.020	R22AN-995-F20M1	RM9505-603-4126-G327
.032	R22AN-995-F32M1	RM9505-603-4128-G327
.041	R22AN-995-F41M1	RM9505-603-4130-G327
.047	R22AN-995-F47M1	RM9505-603-4132-G327
.091	R22AN-995-F91M1	RM9505-603-4134-G327
	NICKEL-CHROMIUM-IRON ALLOY (INCONEL) SPEC. QQ-W-390 AND MIL-R-5031	
.020	R22AN995-N20M1	R9525-603-8380-G327
.032	R22AN995-N-32M1	R9525-603-8382-G327
.040	R22AN995-N40M1	R9525-603-8384-G327
.091	R22AN995-N90M1	R4000-C04-3535-G327
.051	R22AN995-N50M1	R9525-612-3159-G327

FROM THE GROUND UP

Selected Forced Landings,
Incidents,
Ground Accidents,
Notes and Comments on
Aircraft Accidents



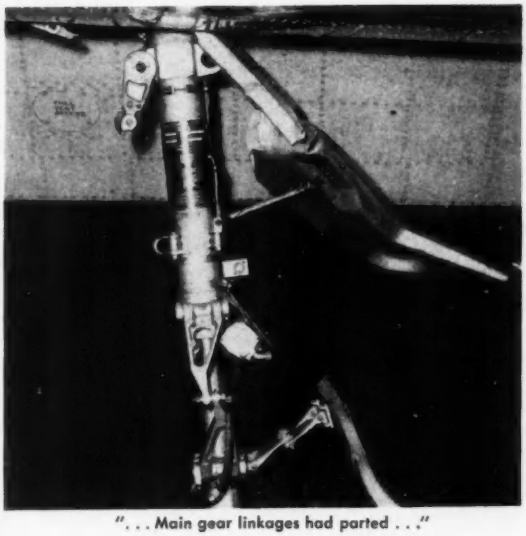
Two additional O-ring seals were installed (above) covering the annular passages (right).

TOO MANY O-RINGS—An F9F pilot returned for landing and discovered that his port main gear would not come down. Hydraulic pressure was indicating normal. He attempted to apply negative G and shake the gear down by zooming and by hard rudder action. Not succeeding, he slowed to 130 knots and actuated the emergency air bottle. This failing, the pilot elected to land with the port landing gear up. Fuel state at the time the malfunction was discovered was 900 pounds, landed with 600 pounds.

On disassembly, it was discovered that the hydraulic uplock cylinder was improperly assembled. The unit requires three O-ring seals. However in this case two additional O-ring seals were installed covering the anular passages thereby blocking the flow of hydraulic fluid or air.

This error was brought to the attention of the proper shop stressing that the Handbook of Maintenance Instructions be used as a guide in making repairs to insure correct assembly.

PRELOAD—A T-28 completed a series of loops, rolls, and half-cuban eights, then letdown and leveled out at 3000 feet with 290 knots and 4G. There was a shudder and two loud bangs as the red "gear unsafe" light came ON. Another aircraft observed that both main gear linkages had parted, allowing the main gear to swing freely. An emergency landing was made with all three gears still down, and no further damage.



"... Main gear linkages had parted ..."

Examination disclosed the following: The port and starboard gear were 15-20 degrees beyond the vertical position, with locking arms parted. The bolts which connect the locking arms of the port and starboard landing gear were found sheared cleanly.

A report from O&R indicated that the failure was a result of an improper adjustment of the landing gear up-lock hook assemblies, Part No. 159-33464. These up-lock hooks were reported to have been adjusted with one-eighth inch clearance, rather than with one-eighth inch preload, which allowed the landing gear to become unlocked under the accelerations applied.

DOUBLE ERROR—On landing rollout an R4D-8's gear warning light came ON, its horn sounded and its tailwheel retracted. The tail was then jacked up, a safety cable placed in the down-lock position, and the aircraft was taxied safely into the transient aircraft parking area where the engines were secured.

It was determined that an over-inflated tail oleo reduced its shock-absorbing characteristics and created an incompressible oleo reaction, which, in turn, unlocked the tail down-lock actuating cylinder.

The aircraft was jacked up and the tail oleo was serviced in accordance with maintenance instructions. The gear was cycled at least five times in an attempt to establish the cause of the tail unlocking incident. In each cycle all landing gear operated correctly, with no visual malfunctions at the tail gear assembly. The aircraft was then lowered to the ground and manually shaken laterally. At this point the tail gear link assembly failed and the aircraft settled to the ground, damaging the tail section and jack-point.

Due to the position of the lateral cracks in the upper multi-clevis attaching holes in the tail gear link assembly, the cracks were not noticed, and in turn, failed when the aircraft was shaken by maintenance personnel.

The squadron concerned recommended that, when a landing gear failure or malfunction is encountered at locations other than the permanent station, a complete inspection should be made of all structural components.

*There have been other instances of R4D tailwheels collapsing after maintenance (*APPROACH, *March '58, Page 41). It is suspected that Fitting, Tailwheel Shock Strut Upper Joint Block, Part No. 2371922 was installed inverted as incorrectly shown in IBP AN 01-40NK4, Page 314, Fig. 162, Item 39.—Ed.*

JUST OUT—An informative booklet is the Fuel Contamination Information Manual, NAVAER 00-80T-74 issued by the Office of the Chief of Naval Operations Aviation Training Division available now. Copies may be obtained by ordering same from the nearest Aviation Publications Facility.

Topics under the subject of Fuel Contamination include: Jet Engines and Jet Fuels; Tanks, Pumps and Lines; The Human Factor; Foreign Particles; Water; Emulsions; Mixed Fuels; Visual Standards of Clean Fuel; Visual Inspection Procedures; Receiving Point; Storage Tanks; Fill Stands and Service Tanks; Filter-Separators; Refuelers and Fuel in the Aircraft.

This booklet is also on sale at 30 cents per copy—write Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

Continued from preceding page

HYDRAULIC FLUID CONTAMINATION — Flight control system discrepancies, ranging from locking of the controls and failure to change over from one system to the other to reports of stiff controls at altitudes, have been noted by operating activities. Hydraulic fluid samples taken for contamination test after the subject discrepancies occurred proved negative. However, additional investigation has shown that the findings from the fluid samples were not conclusive since a small quantity of water was trapped in the valves, switches, accumulators, in the flight control systems and went undetected at the time of the tests.

To illustrate the effect of water in the hydraulic fluid of the flight control hydraulic system, one instance is quoted per the pilot's statement:

"During flight at 42,000 feet, the controls stiffened up. The stick was extremely hard to move and, once displaced, would not return to neutral. Descent was made to 25,000 feet and the controls loosened up. After climbing back to 40,000 feet, they stiffened again."

The airplane was ground checked, and it was determined that the aileron trim bungee was malfunctioning. When the bungee was removed, it contained water. The bungee was disassembled and lubricated, and the next flight was satisfactory.

Another discrepancy concerning stiffening of the flight controls was also reported. A summary of this report is provided as follows:

A pilot who returned from a high altitude flight (40,000 feet) reported that higher than normal stick breakout forces were necessary to move the stabilizer and ailerons. Fluid samples taken from the flight control system were very cloudy and contaminated with a gray substance; also, the fluid was a light pink color instead of the normal dark red color of clean hydraulic fluid. A check of the hydraulic system servicing units was also made and a quantity of water and other foreign matter was *discovered in the reservoir servicing units.* The servicing units were squadron-manufactured and were not adequate to prevent the entrance of rain water into the reservoir of the servicing unit. (After this discovery, the squadron initiated action for procurement of improved servicing units.)

A container of the contaminated fluid from the subject airplane was sent to NAA for laboratory analysis. The results of the analysis revealed that the sediment in the fluid was fibrous material, paint and trace amounts of metal chips. The quantity of water contamination in the fluid was approximately 0.5 percent. The water droplets in the subject hydraulic fluid could not be emulsified into the hydraulic fluid and became frozen at temperatures below 30° F. It was determined that the water present would be sufficient to cause high breakout forces. Previous laboratory tests have shown that an approximate one percent water contamination doubles the flight control actuator control valve breakout force at —65° F. Also, demonstrations have revealed that there is an increased valve operating load after breakout when water contamination is present in the hydraulic fluid.

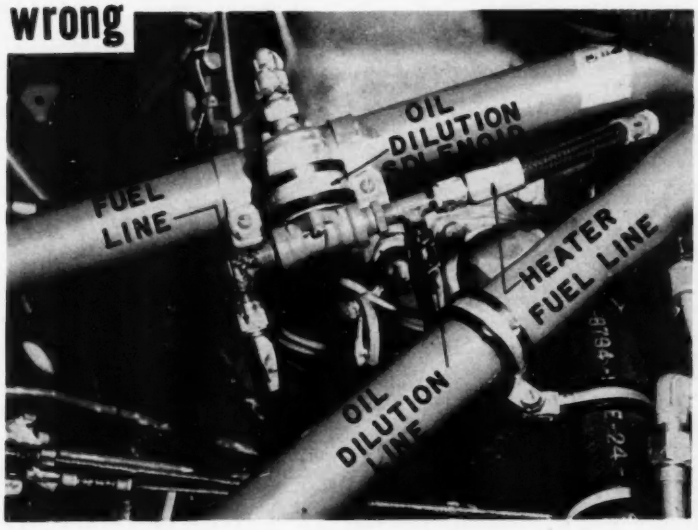
The seriousness of water contamination in the hydraulic system fluid cannot be overemphasized. Pilot personnel of the squadrons which reported the stiff controls later disclosed that they had noticed an increase of breakout forces in the flight control systems. Since this increase was gradual and progressive, it was not reported as a malfunction. When an actual malfunction did occur (extremely stiff controls at altitude), water contamination in the hydraulic fluid of the affected airplanes proved to be most severe. The other airplanes were found to have water contamination in varying amounts. To remove the water contaminated hydraulic fluid, the flight control hydraulic systems were extensively flushed (i.e., lines disconnected and valves, switches, etc., removed and drained). After flushing of the hydraulic systems, the pilots reported a noticeable *decrease* in breakout forces at altitude in comparison to the breakout forces to which they had become accustomed.

In an effort to aid those personnel who may encounter similar problems with the flight control systems, the following suggestions are offered:

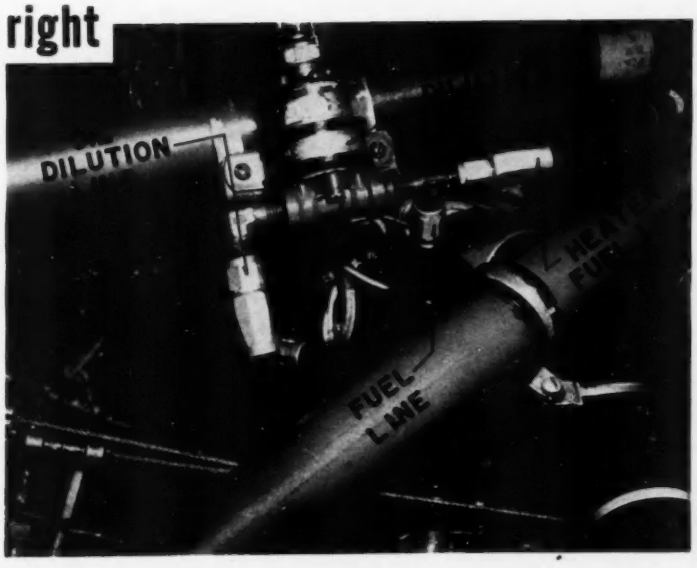
1. In all cases of flight control system malfunction, always take fluid samples.
2. Establish procedures to incorporate the taking of fluid samples during each preflight inspection.
3. If failure occurs, always suspect hydraulic fluid water contamination first. Thus, assurance is made that fluid samples will be taken.
4. Inspect servicing units daily for contaminated fluid prior to servicing airplanes.
5. Evaluate all flight control discrepancies carefully. Be specifically wary of reports of stiffening controls, failures to change over, decreases in pressure at altitudes and varying functional operation at different altitudes.— *NAA Service News.*

OIL CAPS, TV-2—All pilots and maintenance personnel should exercise extreme care in securing oil caps on the aircraft. The design of the TV-2 oil cap is such that it can be insecure and yet have the appearance of being secure.

wrong



right



WRONG LOOKED BETTER THAN RIGHT

On 31 January 1957, a T-28B was transferred from an O&D to a squadron. Since that time this aircraft has been downed 20 times for fumes in the cockpit. In each case corrective action was taken and the aircraft given a CO test and placed in an UP status for further flight. Repairs included replacing dzus fasteners, fairing, seals, dust covers and butterfly doors. However these appeared to be only temporary repairs because a short time later the aircraft would be downed again for fumes in the cockpit.

In August 1957, technicians from a local O&R were called in and made three flights to test for carbon monoxide, acrolein, aldehydes and other combustion products. All tests were negative.

On 5 December 1957, the aircraft was again downed for fumes and possible CO in the cockpit. While investigation was in progress it was noted that there was engine oil standing in the heater exhaust port. Further investigation revealed that the fuel line from the carburetor was reversed with the oil dilution line at the oil dilution solenoid. (See enclosed photos.) With the lines reversed, no fuel could pass from the carburetor to the heater unless the oil dilution solenoid and heater solenoid were activated (switches in the front cockpit). However, oil from the oil tank was allowed to pass to the heater with the heater solenoid activated and this, in conjunction with a faulty heater, allowed fumes to enter the cockpit through the ventilating system. This Murphy installation caused the aircraft to be downed 20 times and involved an estimated 55 man hours spent in futile corrective action.

By viewing the gas line installation without reference to the Instruction Manual, the incorrect hook-up looks more logical than the correct routing. The installation of a larger elbow fitting at the oil dilution solenoid connection or color coding the two couplings could prevent interchanging of the fuel line with the oil dilution line. All aircraft assigned and subsequently received were inspected for correct routing but no further discrepancies were found.

MURPHY'S LAW

If An Aircraft Part Can Be Installed Incorrectly, Someone Will Install It That Way.

Shrewd Dude

DID you hear about the young lad who saved Uncle Sam $376,000? He accomplished this in less than 5 minutes. All he did was to admit that he was lost, and in a few minutes he was on his way to a neighboring field to replenish the thirsty bear with a little JP. The lost plane procedure on the knee board is to be used when you are lost. It was given to you in case you do get disoriented. It's no crime to get lost, but it's a hell of an offense to stay lost.

Have you read LOST & FOUND, page 12?—Ed.

Copilot Briefing

"FROM 1951 through 1956, 31 air carrier accidents have been attributed to inadequately trained copilots."—ALPA

Administrative pilots, who fly with different people of varying proficiency may wish to ponder a moment over this statement before taking the active.—Ed.

Location of Emerg Procedures

IN NORFOLK SAR Circular No. 7-57, Commander, Fifth Coast Guard District, makes the recommendation that all emergency procedures be placed in the same, easy-to-find location—on the inside front cover of all RadFacs, SFIDs and CAA Flight Info Manuals. He further recommends that the front cover of each pub bear a large, bold-face notice on the front cover reading, "EMERGENCY PROCEDURES ON NEXT PAGE". This recommendation, if adopted, could expedite action by aviators who may find themselves lost or in doubtful or emergency situations.

Presently RadFacs and SFIDs have some emergency procedures buried on the Special Notices page, some more in a corner of the inside rear cover. Readers who concur with APPROACH that the recommendation is an extremely good one are encouraged to use the reply card contained in the pubs to make their agreement known to the right people.

Trapped Water

WATER trapped in rudders: Drain holes get plugged with dirt, and water builds up from rain and wash racks. Can change C.G. considerably, with moment arm far aft at tail of plane.

Caution maintenance to check drain holes regularly, double-check each plane as it comes off the wash racks. Also instruct *all* pilots to shake rudders on preflight and listen for sloshing water.

Check-In

NEAR mid-air reports continue to come in from fields where both pilots are using the same leg of the range at the same time. If it isn't standard procedure in your area for all pilots using range, homer, omni or tacan to check in with approach control or appropriate unit, it should be! Thus pilots will be advised of other traffic, be separated accordingly, and both pilots and controllers will get more training.

Record It!

"IT IS not unlikely that many points of flying technique are communicated verbally from instructor to pilot and from pilot to pilot, and seldom or never become part of formal manuals, with the risk that some become lost."—From a talk by Supt. of Aero-Medicine, Dept. of Civil Aviation, Australia.

Some of these tips are rediscovered, tragically, later. Submit a report or Anymouse now!—Ed.

Clean-up Time

The following is an excerpt taken from the First Endorsement:

"It is noted that this is the second aircraft lost by this squadron —both due to switch trouble. It is very strongly felt that although cockpit instrument layout is good, there are altogether too many controls for the various aircraft systems. There are _____ switches for the armament system alone, and _____ additional switches for the radar. There are three for the air conditioning system, and five for the exterior lights. Removal of extraneous switches and controls would clean up the cockpit to where overall system management would be simplified. It is recommended that:

1. The ordnance system controls be reduced to a single master switch and one other large ordnance select knob.
2. All aircraft systems, controls and indicators be placed on separate panels, one panel for each system.
3. More emphasis to be placed on human engineering the system to the pilot's ability to handle it. Laboratory breadboard type controls should never be allowed in the cockpit. From the pilot's standpoint this is now occurring."

WHIZ QUIZ ANSWERS from page 29.

1. FALSE. All CO_2 flotation equipment is inspected every 90 days.
2. FALSE. The leg buckles, to prevent falling out head-first.
3. TRUE. The chaser will turn the dye-marker dirty grey. Of course if you have the marker out, and sharks come. . . . . ?!
4. TRUE. (Mk-IV, MK-VII. This doesn't apply to PK-2 kit.)
5. TRUE.
6. Normally, by c.
7. Called to the attention of the rigger (d), who will down the chute.
8. The multi-place raft from either side or end (a, e); and the PK-2 from the stern or small end (d).

approach INDEX

Vol. 3 July 1957 June 1958

the first tour PILOT in the squadron . . .

FIRST tour with the fleet, coming up. You've flown jets, fired at targets, landed on a carrier, and sat through many sleepy after-lunch periods of chalk and blackboard. You're *ready*. Ready for a checkout in that sleek bird with the air conditioning, power steering, and that afterburner that makes you GO GO GO (when you push the go button). Ready for that slick golf course too—saw some mighty charming shorts-clad creatures teeing off when you first came aboard the station.

But don't be too surprised if you find that school isn't out, that the Ops officer tells you you'd better put a good coat of wax on those Spaldings and stow 'em for a while.

You've just begun to learn, your whole first tour with this squadron of tigers will be one big PG course. You'll be learning every day, every briefing, lecture, flight, and demonstration will be part of your graduate training. For in today's military aviation, a professional aviator is more than a man who flies for pay. You're not a professional yet, not by a long, flamedout glide. Take a good long look at some of the senior aviators in your new outfit—they don't wear a sign or a label, but you'll see the mark of a professional aviator. That's what you're working toward.

And now for your ground school schedule . . . Turn to page 10 and read "The Black Stallion."